

Academic
Year

2018-19

Graduate Student Handbook

Department of Plant Sciences

Herbert College of Agriculture

The University of Tennessee - Knoxville

August 2018

ABOUT THIS HANDBOOK

This handbook describes our department, how it can help you succeed and its expectations of you as a graduate student. We have included links to The University of Tennessee Graduate School's handbook, as well as information about various university services, publications, fees, helpful offices & phone numbers that recent graduates have indicated were helpful. Please feel free to consult any of us if you have questions or suggestions.

Department of Plant Sciences

The University of Tennessee – Institute of Agriculture
Knoxville, TN

Phone: (865) 974-7324; <https://www.facebook.com/utkplsc>;
<https://ag.tennessee.edu/plantsciences/Pages/default.aspx>

Please note: Adoption and accuracy of these drafted Departmental policies, procedures and curriculum, as outlined in this handbook, are subject to pending and final approvals by Herbert College of Agriculture, UT Graduate School and UT Faculty Senate committees. As such, ***terms of this handbook are subject to change.*** Contact the PS Graduate Director if you have questions.

Plant Sciences Graduate Committee:

Bill Klingeman, PS Graduate Director

Jim Brosnan

David Butler

Dennis Deyton

Larry Steckel

Neal Stewart

EQUAL EMPLOYMENT OPPORTUNITY (EEO) AND AFFIRMATIVE ACTION (AA) STATEMENT/NON-DISCRIMINATION STATEMENT

The University of Tennessee does not discriminate on the basis of race, sex, color, religion, national origin, age, disability or veteran status in provision of educational programs and services or employment opportunities and benefits. This policy extends to both employment by and admission to the University.

The University does not discriminate on the basis of race, sex or disability in its education programs and activities pursuant to the requirements of Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act (ADA) of 1990.

Inquiries and charges of violation concerning Title VI, Title IX, Section 504, ADA or the Age Discrimination in Employment Act (ADEA) or any of the other above referenced policies should be directed to the Office of Equity and Diversity (OED), 2110 Terrace Avenue, Knoxville, TN 37996-3560, telephone 865.974.2498 (V/TTY available) or 974.2440. Requests for accommodation of a disability should be directed to the ADA Coordinator at the UT Office of Human Resources, 600 Henley Street, Knoxville, TN 37996-4125.

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Welcome to the Department of Plant Sciences

We are very happy that you have chosen to pursue an advanced degree with us and we look forward to working with you over the next few years. I am confident that most of you will be able to look back on this experience as one of the more enjoyable and exciting times of your life. You are making the transition from student to professional, and you will be conducting independent research; research of which you will be proud. Do your best in your coursework and your research project, but don't miss out on enjoying the friendship of your fellow graduate students, in this department as well as others. It is true in my case, and I am quite sure that the faculty in our department will agree...some of the best friends you will cultivate in life are fellow graduate students.

This handbook is intended to serve as a resource for information regarding policies and procedures in the Plant Sciences graduate program. We would encourage you to read it thoroughly at your first opportunity. It is not intended to be a complete, all-inclusive guide. New questions and issues arise on an almost daily basis. But we have attempted to put in this book some of the more pertinent policies and procedures regarding your graduate program experience and believe that it will be a useful resource.

Please do not hesitate to contact your advisor, a faculty member (particularly those who are members of your committee), our Graduate Director Dr. Bill Klingeman, or me if you have any questions, need guidance, or have suggestions. We welcome input on ways to strengthen this experience for future students. I have an open door policy. My office is in Room 358 Plant Biotechnology Building.

Again, welcome to the department! We are glad you are here. Make the most of your experience, and do not hesitate to call on our faculty, staff or me for assistance.

Sincerely,

Dr. Scott Senseman

Dr. Scott Senseman, Department Head

CONTACTS

Students are referred to the UT website (<http://www.utk.edu/>) for the most up-to-date listings of phone numbers and e-mail addresses.

The University of Tennessee

Knoxville, TN 37996-0220

Office Hours: 8:00 a.m. - 5:00 p.m. M – F

General Information: 865.974.1000 Voice/TTD 865.974.6087; FAX 865.974.0088

URL: <http://www.utk.edu/>

Disability Student Services

Counseling Service

191A Hoskins Library

865.974.6087; FAX 865.974.0088

Graduate Admissions and Records

Office of Graduate Admissions and Records

218 Student Services Building

865.974.3251; fax: 865.974.6541

Center for International Education

Director

1620 Melrose Avenue

865.974.3177; fax 865.974.2985

Registrar

209 Student Services Building

865.974.2101

University Evening School

Director

451 Communications Building

865.974.5361; fax 865.974.2027

Transcripts

209 Student Services Building

865.974.2101

Veteran's Benefits

209 Student Services Building

865.974.1507

Financial Assistance

Assistantships: Head of applicable department or program

Fellowships and Scholarships: Staff Assistant, Office of Graduate Admissions and Records

Loans, Work-Study: Director of Scholarship & Financial Aid, 115 Student Services Building 865.974.3131; fax: 865.974.2175

Housing

Student Apartments:

Office of Rental Properties, 107 S. Stadium Hall

865.974.3431; fax: 865.974.0078

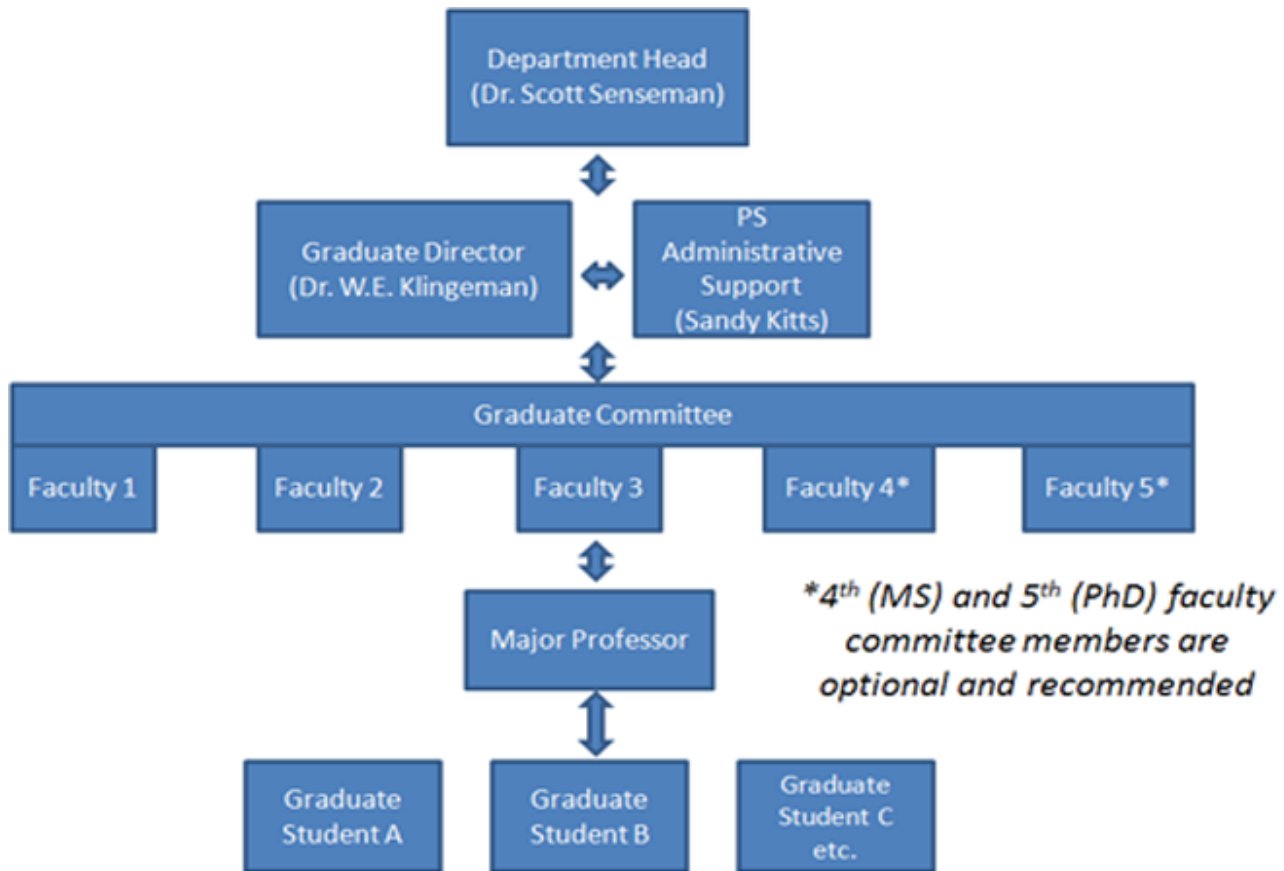
Residence Halls (Dormitories):

Office of Residence Halls, 405 Student Services Building; 865.974.3411

Married Student Housing, 405 Student Services Building; 865.974.3411

Off-Campus Housing, 405 Student Services Building; 865.974.2571

Department of Plant Sciences' Graduate Administrative Structure



Plant Sciences (PS Degrees and Program) Overview

The Department of Plant Sciences is part of The University of Tennessee, Institute of Agriculture. The faculty and staff in the department have appointments in the Herbert College of Agriculture, AgResearch, and University of Tennessee Extension.

The Department of Plant Sciences provides educational and research opportunities in the areas of plant science, from molecular to systems levels, dealing with improvement, growth, and management of food, fiber, turf and ornamental crops, and the practice of public horticulture. Our department offers courses which apply to public horticulture, breeding, genetics, growth, physiology, and management of these plants, leading to their efficient production and use under different environmental and management situations.

Excellent laboratory and field resources are available for education, research and teaching in Knoxville and other locations across Tennessee. The addition of the Plant Biotechnology building in 2003 provided the Department with excellent laboratory space and facilities for all types of plant science research. Our greenhouse facilities have recently received major renovation and expansion that has increased our research, outreach and teaching capabilities. The UT Gardens provides excellent training, education and research opportunities for students interested in public horticulture.

General Duties and Responsibilities of PS Faculty and Graduate Students

Plant Sciences graduate students who are awarded assistantships have exhibited a high level of scholarly achievement and are expected to be capable of completing a rigorous and high quality graduate program. Time devoted by the student to academic studies is expected to accommodate responsibilities inherent to an assistantship. An appropriate balance should be agreed upon in consultation with the student's major professor. Students are expected to exhibit the same degree of commitment, responsibility, and accountability as any other staff or faculty member employed by the University. As stewards to the mission of the Department of Plant Sciences, our graduate students and faculty are expected to participate in departmental and institutional seminars, professional development and departmental social activities. We expect that our graduate students recognize an important purpose of graduate training is to develop a high degree of personal professionalism. Our students should strive to pursue opportunities for training as an academic *specialist*, including participation and presentation at professional and scientific meetings that lead to a significant level of professional competence. Our faculty should play a key role in preparing our graduate students to participate in and achieve these goals.

Please be aware: *You, not your major professor or departmental staff, are responsible for the success of your graduate program. It is your responsibility to be aware of University and Department of Plant Sciences al rules and regulations. You must follow these rules and stay on top of University, Graduate School, and Plant Sciences Departmental deadlines to graduate.*

GRADUATE DEGREES OFFERED IN PLANT SCIENCE

Within the Herbert College of Agriculture

MAJORS	DEGREES
Plant Sciences	M.S.
Plant, Soil, and Environmental Sciences	Ph.D.

MINORS (for graduate students pursuing either M.S. or PhD Degrees)

Plant Sciences
Statistics (via IGSP for Plant Sciences)

Concentrations in crop sciences, horticulture, plant breeding, plant molecular genetics, and weed science are available to MS and PSES PhD students.

For information about the **College of Architecture and Design** and **Herbert College of Agriculture** joint **Masters of Landscape Architecture (MLA, MALA and MSLA) degrees**, visit pages 51-55 and 243-244 for a link to the Online Graduate Catalog:

<http://catalog.utk.edu/index.php>

Two graduate degrees are offered by the Department of Plant Sciences: the Master of Science with a major in Plant Sciences, and the Doctor of Philosophy with a major in Plant, Soil, and Environmental Sciences (PSES). For additional information, please visit our departmental homepage at <http://plantsciences.utk.edu> and individual faculty pages at <http://plantsciences.utk.edu/faculty.htm>.

Inquiries may be directed to Dr. Bill Klingeman, Graduate Committee Chair, Department of Plant Sciences, The University of Tennessee, Knoxville, TN 37996.

PLANT SCIENCES MASTER'S PROGRAM

Both *thesis* and *non-thesis* options are available for the major in Plant Sciences, each guided by a graduate advisory committee consisting of the major professor and two or more other faculty members. Studies are possible in a wide variety of commodities and subject areas, including biotechnology, cereals, ecology, fiber crops, fruits, genomics, grains, legumes, molecular biology, physiology, plant breeding, plant protection, tobacco, turfgrass, vegetables, weeds and woody ornamentals (including native plants), as well as public horticulture.

Concept of the Plant Sciences (PS) Master of Science degree

M.S. thesis option

The purpose of the thesis option is to develop the capacity to perform quality research in the student's field of interest. The M.S. degree program in PS emphasizes active communication of ideas, rather than passive acquisition of information. Students are asked to perceive a problem of current importance to science, the public, or industry; to organize information and the experimental facilities needed to conduct sound science while investigating the problem. Finally students are expected to write and defend a formal document, or thesis, which describes the steps in the problem-solving process, justifies the validity of the approach and discusses results. Thus, the thesis is the primary device for conducting the M.S. training program, and a course of study is individually tailored to support each thesis project. PS theses often involve both fundamental principles and practical applications of knowledge, oriented toward the culture, ecology, physiology or molecular genetics of one or more appropriate model plant species. PS theses in public horticulture may include historic landscape preservation, education and outreach, and horticultural therapy in studies integrating research with information sciences and communication to public audiences. Successful M.S. candidates are encouraged to present their results and conclusions at meetings of professional societies and to publish their work in professional journals.

M.S. non-thesis option

Plant Sciences M.S. graduate students typically undertake the responsibility and experience of preparing a M.S. thesis. Under certain circumstances, however, M.S. students may pursue a non-thesis option in Plant Sciences. Students in the non-thesis program conduct graduate projects with varying degrees of sophistication, to enable them to practice skills and concepts learned in their coursework. The research or design project serves to unify the non-thesis program and fashion it according to the student's specific personal objectives. Students electing this option take more classes

than M.S. thesis students and are required to write and submit a report on their project, as well as attend and present seminars. Contact the graduate coordinator to discuss the M.S. non-thesis option and possible limitations of this degree.

Admission requirements to M.S. program

Students should have a Bachelor's degree from an accredited college or university, with evidence of ability to do work of graduate quality. Applicants are expected to have a minimum cumulative grade-point average of 2.7 on a 4.0 scale.

Application can be made online at <https://www.applyweb.com/apply/utg/> for a \$35 application fee (payment made to *The University of Tennessee*). Please note that portions of the application process are sent to both the Office of Graduate and International Admissions and the Department of Plant Sciences. Transcripts and the application fee should be sent to the Office of Graduate and International Admissions. The Department of Plant Sciences application requires three letters of reference (or three Graduate Rating Forms) from persons capable of assessing the applicant's suitability for graduate work in plant science, resumé, and statement of professional goals and reasons for applying to the program. Applicants are also required to submit scores from the general Graduate Record Examination (GRE) to Graduate Admissions (please send photocopy to department). The institutional code for UT is 1843. Successful applicants will usually score above the 50th percentile on the verbal, mathematical and analytical sections of the GRE. Prior undergraduate course work in biology, chemistry, and mathematics is recommended.

M.S. degree requirements

[Please see the Graduate Catalog for more specific information.]

1. Approval of the academic program by the master's advisory committee.
2. Successful completion of 12 hours of coursework in the major at the graduate level (400 or above), exclusive of PLSC 500, 502, and 503.
 - *With approval of the student's advisory committee, six (6) of these hours may be satisfied by the following courses, which accommodate particular academic objectives but are not available within the PS department (see pp. 18-19 for individual course descriptions):*
 - Art 481
 - Biochemistry, Cellular & Molecular Biology 412, 522, 523
 - Ecology and Evolutionary Biology 414, 433, 560
 - Environmental and Soil Sciences 434, 516, 544
 - Geography 439
 - Information Sciences 560
 - Environmental and Soil Sciences 434, 511, 516, 544
 - Sociology 633 [or SOC 531 or EDPY 583]
 - Students must enroll for at least 3 credit hours of PLSC 500 during the semester in which you intend to graduate.

M.S. thesis option:

1. Satisfactory preparation of a written thesis proposal and its oral defense to the student's committee.
2. Successful completion of 30 hours of graduate credit, which must include 6 hours of 500.
 - At least 14 of these hours must be numbered 501 or above.
3. Completion of the final written thesis and its oral defense
4. An understanding of research ethics is also required. This departmentally-enforced requirement may be achieved through coursework (e.g., PLSC 525 /ANSC 525 /CEM 525; BCMB 614; PSYC 660) or via online (CITI RCR) training, as evidenced by presenting a valid CITI RCR certificate to the Graduate Director upon submission of the Application to Candidacy form. For human subjects research, CITI IRB certification may also be required.

M.S. non-thesis option:

1. Successful completion of 34 hours of graduate credit, which must include 2-4 hours of PLSC 503.
 - At least 22 of these hours must be at the 500-level or above.
2. Completion of a project & preparation of a summary written report.
3. An understanding of research ethics is also required. This departmentally-enforced requirement may be achieved through coursework (e.g., PLSC 525 /ANSC 525 /CEM 525; BCMB 614; PSYC 660) or via online (CITI RCR) training, as evidenced by presenting a valid CITI RCR certificate to the Graduate Director upon submission of the Application to Candidacy form. For human subjects research, CITI IRB certification may also be required.
4. Passing written and oral examinations covering the project & coursework.

Forms available through the Graduate School include admissions to candidacy for the M.S. and Ph.D. degrees (<http://web.utk.edu/~gsinfo/acforms.shtml>).

THE PLANT, SOIL, AND ENVIRONMENTAL SCIENCES (PSES) DOCTORAL PROGRAM

A Ph.D. in Plant, Soil, and Environmental Sciences (PSES) is offered under a multi-departmental doctoral program in the Herbert College of Agriculture. Two departments participate: **Plant Sciences** and the soil sciences faculty in **Biosystems Engineering & Soil Sciences**, who administer the environmental and soil sciences concentration. Please see the Plant Sciences homepage for additional information, <http://plantsciences.utk.edu>, or contact a faculty member in the area of interest.

Admission requirements to Ph.D. program

Submit application, fee, official transcripts, and scores from the general portion of the Graduate Record Examination to the Graduate Admissions Office (see online admission requirements for the Master's Degree). In your application, specify that you are applying to the Plant, Soil, and Environmental Sciences doctoral program and indicate the concentration that best suits your field of academic interest. You will also be asked to submit (online) a résumé or CV, three (3) letters of reference (or three (3) Graduate Rating Forms), your GRE test scores and a short statement of professional goals and reasons for applying. In your statement letter and application, please indicate your concentration of interest and intended major professor.

PSES Ph.D. degree requirements

To obtain a PSES doctoral degree, students must meet the following requirements:

1. The student and the major professor will select a minimum of three additional faculty members, holding the rank of assistant professor or above, to serve on the student's doctoral advisory committee.
 - i. The major professor and two committee members must be approved to direct doctoral research by the Graduate Council.
 1. Policies established by the Department of Plant Sciences require that untenured, tenure track faculty have served as advisors to 2 M.S. students prior to directing a student's dissertation as the major professors.
 2. Untenured, tenure track faculty can serve as co-advisors on student dissertation projects until the M.S. advisory criterion is met.
 - ii. At least one member of the committee must be from outside the department.
 - iii. The doctoral committee must be formalized by the end of the second semester of graduate study.

2. Submission of an approved program of study must be completed by the end of the second semester of graduate study.
 - i. A candidate for the doctoral degree must complete a minimum of 24 hours of graduate coursework beyond the master's degree.
 - ii. Candidates not having a master's degree must complete a minimum of 48 hours of graduate coursework beyond the B.S. or B.A. degree.
 1. A minimum of 12 of the 24 hours, or 30 of the 48 hours, must be graded A-F.
 2. At least 9 hours of the student's coursework must be from outside the PSES concentration area, and a minimum of 6 semester hours must be taken in UT courses numbered 601 or higher, excluding PSLC 602.
 3. In addition, 24 hours of course 600 Doctoral Research and Dissertation are required. Once a student initiates enrollment in PLSC 600, 3 credit hours per semester *must be continued* each subsequent semester, including the summer session.
 4. Doctoral students must enroll for *at least 3 credit hours* of PLSC 600 during the semester in which you intend to graduate.
 - iii. The student's graduate advisory committee must approve the curriculum of study.
3. Satisfactory preparation of a written dissertation proposal, a proposal seminar, and its oral defense to the student's committee. This must be completed during the first two semesters of graduate study and *before* enrollment in 600.
4. Passing both written & oral sections of the comprehensive preliminary exam.
 - i. The candidate will be tested on his/her knowledge of the proposed dissertation and related fields.
 - ii. Students may have no more than two attempts at passing comprehensive exams.
5. An understanding of research ethics is also required. This departmentally-enforced requirement may be achieved through coursework (e.g., PLSC 525 /ANSC 525 /CEM 525; BCMB 614; PSYC 660) or via online (CITI RCR) training, as evidenced by presenting a valid CITI RCR certificate to the Graduate Director upon submission of the Application to Candidacy form. For human subjects research, CITI IRB certification may also be required.
6. Satisfactory preparation of a written dissertation and its oral defense to the student's doctoral committee. The dissertation may consist of a series of published manuscripts in lieu of a traditional dissertation.

[Please see the Degree Program Requirements/Doctoral Degrees section at the front of the graduate catalog for additional information.]

Forms available through the Graduate School include Admissions to Candidacy for the M.S. and Ph.D. degrees (<http://gradschool.utk.edu/gradforms.shtml>).

Admission procedure and application deadlines

To learn more about our department and programs, please visit our website (<http://plantsciences.utk.edu/>). Much information relevant to the application process and life as a Plant Sciences' graduate student can be found at (<http://plantsciences.utk.edu/graduate.htm>).

Please note that admission requirements <http://animalscience.ag.utk.edu/Teaching-Graduate-Admission.html> state that a student must have obtained a 2.7 grade point average on a 4.0 scale in a completed undergraduate degree program in plant sciences or related area. We also require the Graduate Record Exam (GRE) (general or basic test, University code: 1843). We do not have a minimum score required on the GRE test, but successful applicants typically score within the top 50th percentile per category. Applicants to the PhD program normally should have completed a master's degree before beginning the doctoral program. Please carefully review application procedures.

In special circumstances that are reviewed on a case-by-case basis, graduate students may be admitted to the departmental graduate program on conditional or probationary status, following consultation with the departmental graduate committee, major professor, and department head. These admission types and actions leading to their resolutions will be specifically addressed in the offer letter.

Your application is considered largely on balance of the quality of materials you submit online to the Office of Graduate and International Admissions, which includes 3 professional peer reference letters (contact information requested via online application process), and Plant Sciences' request for submission of name(s) of preferred mentor(s), your academic biosketch, a statement of (research) interest & a current résumé or CV.

To allow both the UT Graduate School and the Department of Plant Sciences time to process your submission, we follow **application deadlines** as established by the UT Graduate School: <http://gradschool.utk.edu/admissions/deadlines/>

Please also note that final admission, regardless of assistantship status, will require that you will have obtained a commitment from one of our faculty members to serve as your graduate mentor (i.e., major professor). A list of all of our graduate research faculty is available at (<http://plantsciences.utk.edu/faculty.htm>) as well as a link to those of our faculty who are approved to direct PhD students (<http://plantsciences.utk.edu/graduate.htm>).

Visit these links to determine if any of our faculty are engaged in research that would be of interest to you, then contact each individual directly to determine 1) their willingness and availability to serve as your graduate mentor (i.e., major professor) and 2) if any part-time employment opportunities may exist to assist you as you pursue graduate studies. In cases where prospective mentor(s) may not have part-time employment opportunities, other forms of financial assistance may exist through the University, which is not directly related to the Department of Plant Sciences but for which students in the department may be eligible (see <http://gradstudies.utk.edu/gradfund.shtml>).

Graduate school procedural deadlines

Deadlines of the Graduate School are given in the Graduate Catalog, and on the following web page: <http://gradschool.utk.edu/graduation/>. The University **Academic Calendar** is online at: http://registrar.tennessee.edu/academic_calendar/

Masters degree candidates must submit the **Admission to Candidacy** form to the Graduate School prior to the semester in which they plan to graduate. Admission to candidacy for the doctoral degree must be applied for and approved at least one semester prior to the date the degree is to be conferred. All forms are now available online (*see below*).

Graduate students are responsible for meeting the requirements established for the M.S. and Ph.D. degree programs that are *in effect at the time that the graduate student successfully achieves candidacy* for the degree they are pursuing.

Your major professor is not responsible for informing you of these dates. You must be aware of them and plan your schedule accordingly.

Graduate school forms

Available online at: <http://gradschool.utk.edu/gradforms.shtml>

Office hours, holidays & vacations

Students on assistantships observe office hours (8:00 a.m. to 5:00 p.m. Monday through Friday) established by the Institute of Agriculture, with exception for class attendance and pursuit of scholarly activities. Students not employed by the University should make their schedule known to the major professor and be available for cooperative work on research projects. Holidays are established and published annually by University administration. Students observe the same holidays as other University personnel.

As part-time employees, students are not eligible for benefits such as accrual of annual vacation and sick leave. Graduate students should schedule anticipated absences with their major professor to ensure that this will not conflict with their research activities.

Students entering a graduate program should realize that there might be occasions when extended working hours will be required for completion of academic and research responsibilities. Research preparation and data collection may require extended hours during the week, some weekends, and occasional holidays during periods of greatest activity.

Leave of Absence (LOA)

In the event of medical conditions, active military duty, and other emergencies, a student may request for a LOA up to 2 years. A LOA form and the supporting documents must be approved by the DoGS and Department Head before submission to the GS. A LOA must be applied before the last day of classes in the applying semester and is not official until receiving an approval from the Dean of the GS. A LOA may

impact the financial status of a student such as graduate assistantship and loans. International students must contact CIE regarding the policy of LOA. Policies and forms of requesting LOA and reinstatement are available on the GS website: <http://gradschool.utk.edu/forms-central/graduate-student-leave-of-absence/>.

Transfer of Credits from Previous Graduate Courses

Courses taken at another institution may be considered for transfer into a master's program as determined by the GAC and approved by the Dean of GS. At the doctoral level, courses are not officially transferred although they may be used to meet degree requirements. Official transcripts must be sent directly to the Office of the University Registrar from all institutions previously attended before any credit will be considered. To be transferred into a master's program at UTK, a course must:

- Be taken for graduate credit.
- Carry a grade of B or better.
- Be a part of a graduate program in which the student had a B average.
- Not have been used for a previous degree.
- Be approved by the student's GAC and the Dean of GS on the Admission to Candidacy form.

Courses transferred to any graduate program will not affect the minimum residence requirements for the program, nor will they be counted in determining the student's GPA. Credits transferred from universities outside the UT system cannot be used to meet the thesis or dissertation requirements or 600-level coursework requirements. Credit for extension courses taken from other institutions is not transferable, nor is credit for any course taken at an unaccredited institution. For more information, see current Graduate Catalog.

TUITION, FINANCIAL AID, AND FEES

Assistantships

The department provides help to all graduate students by way of furnishing plants, greenhouse space, outdoor research areas, laboratory facilities and equipment. Such aid represents a substantial investment of faculty time, facilities and funds.

Graduate students who are awarded an assistantship are eligible for in-state residency classification. Students classified as out-of-state, or whose status is unclear, may submit an application for residency reclassification. The deadline for submission of the application and supporting documentation is on or before the last day of regular registration. The residency classification officer will review the appeal and send a written response by mail. For more information about residency requirements, visit:

<http://registrar.utk.edu/residency/residency.shtml>

Graduate assistantships may be available in the form of graduate research or teaching assistantships sponsored by the Tennessee Agricultural Experiment Station (GRA), by the Herbert College of Agriculture (GTA) or GRAs made available by individual faculty members through grants. Graduate assistantships usually provide a basic stipend plus waiver of maintenance fees and non-resident tuition as well as health insurance. Stipends are subject to federal taxation. Graduate students supported by research assistantships may take up to 6 to 11 semester hours per term (when on half-time GRAs) and 9 to 13 semester hours per term (when on quarter-time GRAs), but may not exceed 20 semester hours for the year.

To avoid a one-time \$49 fee for use of the Student Health Center occasioned by illness during summer, students are required to maintain enrollment in 3 Summer semester hours (***Please Note:*** graduate students on assistantships do retain health insurance coverage during the summer and incur no costs beyond the co-pay if they must see their regular physician). Summer enrollment requirements may be satisfied with 3 hours in PLSC 502 "Registration for Use of Facilities" which do not apply toward PS graduate degree requirements.

Students who receive assistantships or fellowships are discouraged from having other employment and should discuss their intentions with their faculty advisor and Department Head. Information and application forms for assistantships are available from the Head of the Department.

Appointments are normally on a one-fourth to one-half time basis, and the annual stipend is payable in either nine or twelve monthly installments. Graduate research and teaching assistantships are usually awarded to students before their first semester, during the application process. Assistantships are generally not available to graduate students on the non-thesis option.

There is no official provision for annual leave for GAs, GRAs or GTAs. Leaves of absence are permitted by mutual agreement between the graduate assistant and his/her major professor.

Graduate Research Assistants (GRA)

Graduate Research Assistants are employees of the University, the Agricultural Experiment Station and the Department of Plant Sciences. GRAs are responsible to the department head and are under supervision of their major advisor. The GRA contributes to the research program of the Agricultural Experiment Station and at the same time acquires training in research techniques and methods. The GRAs workload in research is considered to be one-half of a full-time equivalent. Thus, they are required to work approximately 20 hours per week to the project of his/her major professor.

The university requires that GRAs on a 12-month appointment maintain full-time status each semester (including Summer). This means that GRAs should register for a minimum of 6 hours of coursework each semester (Spring, Fall) and 3 credit hours (Summer) during their program. Students may fulfill this requirement in the summer by registering for 6 hours of thesis (PLSC 500).

GRAs are classified as student employees and receive student health insurance. They will also receive student activity cards and are eligible for student athletic tickets and official University holidays.

Graduate Teaching Assistants (GTA)

Graduate Teaching Assistants may be employed directly by the Department of Plant Sciences, by the Herbert College of Agriculture, or proportionately by both. GTAs are responsible to the department head and are under supervision of their major advisor. GTAs may assist with departmental teaching and may perform research for their major professor. GTAs who are employed on one-fourth time receive one-fourth the annual stipend and are required to give approximately 10 hours per week of teaching assistance to the department. GTAs who are employed on one-half time receive a one-half time annual stipend and are required to give approximately 20 hours per week of teaching assistance to the department. The assistant must be continually making progress toward the advanced degree and conducting a thesis study during the course of the degree program.

GTAs are required to attend a University Orientation for Graduate Teaching Assistants the first semester that they are awarded this support. For more information, see the Graduate School webpage: <http://gradschool.utk.edu>.

A Special Note regarding International Teaching Assistant (ITA) Test Requirements: Prior to interacting with students in a classroom setting, international students who receive a GTA are expected to take and pass an Oral Proficiency exam: ACTFL OPIc test. Additional information about this test can be reviewed at: <http://gradschool.utk.edu/speaktest.shtml>.

Non-assistantship students

Full and part-time employees may pursue graduate degrees in Plant Sciences or other UT programs. Procedures for making up work and number of hours per semester are detailed at <http://www.tennessee.edu/humanresources> (Policy No.: HR0330).

Students not on assistantship or employed by UT will work with their advisor to determine appropriate courses and research schedules on a case by case basis to ensure a timely progression through the program that also meets the student's employment requirements.

Fellowships

Some graduate fellowships may be available through the University or Graduate School. Eligibility requirements, stipends and responsibilities for graduate fellowships are found at the graduate studies web site (<http://gradschool.utk.edu/>).

Scholarships, loans, financial aid & fees

Up-to-date information about tuition and fees for graduate students can be found on the bursar's webpage: <http://web.utk.edu/~bursar/volxfees.html>

Some scholarships are usually available for students not on assistantships. Applications can be obtained from the Plant Sciences Scholarship Coordinator or from the Herbert College of Agriculture Dean's office. Graduate students may compete for the Hilton A. Smith and National Alumni Association Graduate Fellowships/Scholarships, which are open to all graduate students. The Office of Graduate Admissions can be contacted for information and application forms.

The Office of Financial Aid and Scholarships, at 115 Student Service Building, administers student loans for graduate students.

Tuition exemptions

In addition to the stipend, Graduate Teaching Assistants and Graduate Research Assistants are entitled to a waiver of fees for the period of appointment in accordance with university policy. University fees include a maintenance fee (required of all students), tuition, and a program and services fee. The waiver of fees for assistantships applies to maintenance and tuition fees only; it does not include the program and services fee. Maintenance fees and tuition waivers apply to appointments at a one-fourth time basis or higher.

Employment

Graduate GTA and GRA students with 0.50 FTE appointments may not incur further on-campus work obligations without specific approval from the Dean of Graduate Studies. GRA and GTA students with 0.5 appointments are discouraged from engaging in off-campus employment.

Work-study & hourly work

When funds are available, work-study programs are possible for students needing financial assistance. Part-time employment may be available within ongoing research projects. Details can be obtained by contacting the Department Head.

On & off-campus work for spouses

Part-time and full-time employment may be available for the student's spouse. Availability, types, and compensation will depend upon personal qualifications. The Tennessee Department of Labor and Workforce Development maintains listings of employment opportunities, and seeks to assist new residents finding suitable employment. Information about their services can be found at:

<http://www.state.tn.us/labor-wfd>

Fees for University courses & services

Major fee categories established by the University are maintenance fees, non-resident tuition, and program and services fees. The amounts of these fees are determined annually and are published in the Graduate Catalog of the University. Program and services fees support educational and non-educational services provided by the University and are required of all students. Part-time students may pay less than the maximum amount, depending on the number of hours taken. Fees and expenses for the summer semester are the same as for other semesters during the academic year. Although the summer term is divided into sessions of varying lengths, tuition and fees are assessed at the regular semester-hour rate up to the maximum charge for a complete regular semester. All student fees are due in advance and should be paid in full by due date shown on the *VolXpress* statement. Consult the graduate catalog for details regarding prepayment and deferred payment plans, and refunds for withdrawal.

Out-of-state tuition will be charged to all Tennessee non-residents. However, both maintenance fees and out-of-state tuition are paid for students with assistantships.

Students also pay a \$30 *graduation fee*. There are no additional charges for diploma or binding. The graduation fee is non-refundable and is valid for two semesters after the semester in which it is paid.

Graduate student health insurance

Students who are not receiving assistantships may purchase graduate student health insurance at a reasonable cost. The primary medical service for the health insurance is the on-campus student health clinic.

Graduate students on assistantships receive Health Insurance as a paid benefit of employment with UT. If you hold at least a 25 percent time appointment, you are automatically enrolled in the student health insurance plan as a benefit of your assistantship. You will be issued an insurance card and brochure soon after your department provides your appointment paperwork to the Office of Human Resources. The current plan requires you to be enrolled in at least three graduate credit hours each term to maintain coverage.

Because the University has signed with a new provider, you are no longer required to use the Student Health Service as your primary provider. Should you wish to use the Student Health Service as your primary provider, you have two choices:

- You can register for nine or more hours to cover your health service fee, or
- You can register for fewer than nine hours and pay a \$70 health service fee

If you choose to seek medical care outside the Student Health Service, you should check if your provider is approved in the United Healthcare network to insure

receiving maximum benefits under that plan's coverage. In order to ensure that you receive the best health care possible, please familiarize yourself with the health insurance brochure. This brochure explains insurance deductibles, co-pays, and other plan benefits and requirements. The brochure also provides information about purchasing coverage for your dependent(s) and about the availability of an optional limited dental insurance plan, which may also be purchased.

You can access information about your health insurance on the Graduate Studies Web at <http://gradschool.utk.edu/orientation/health.shtml>. You may also discuss this plan with an insurance manager at the Student Health Service at 974-2264.

GRADUATE DEGREES (*Procedures and Practices*)

- Regulations published in the **UT Graduate Catalog** and **Hilltopics** take precedence over Departmental handbook guidelines wherever there is a conflict.
 - Quotations shown in this handbook are from the Graduate Catalog.
- To receive **GradNews** emails from the UT Graduate School, add your name to the listserve by sending an email request to: <gss3@utk.edu>

Steps to M.S. & Ph.D. degrees

1. Assignment of a faculty advisor (Major Professor)

Every student will be assigned a major professor with expertise in the area of interest expressed by the student. Matching applicants with an appropriate advisor usually occurs prior to admission to the Plant Science graduate program to the mutual acceptance of both student and advisor. In cases where the student is recruited to work on a specific project funded by external funds, the major professor will be the faculty member who received the funds. In the case of departmental assistantships, an effort is made to allocate resources equitably to all faculty or areas of research. This assignment should be made within the first semester of residency.

2. Course registration procedures and timelines

Once graduate students are accepted by our department and the acceptance letter has been acknowledged, students will be provided information regarding their student user ID and password. Upon receipt of this information, students can begin to enroll in courses agreed upon in advance discussion with their major professor. Course schedules can be constructed online using MyUTK. Information about enrollment access to CPO and important semester deadline for graduate students are provided as timelines in UT academic calendars at:

http://registrar.tennessee.edu/academic_calendar/index.shtml.

Credit Hours Required for Full-time Status (w & w/o Assistantships)

Registration is required of all graduate students when using University facilities and/or faculty time. Registration allows the use of services such as library services, laboratories, and recreation facilities not open to the public. The credit hour requirements of full-time graduate students are listed below.

Course load	No assistantship		1/4 time assistantship		1/2 time assistantship	
	Fall/Spring	Summer	Fall/Spring	Summer	Fall/Spring	Summer*
Minimum	9	1	9	1 [3]	6	1* [3]
Maximum	15	12	15	12	15	12

* The minimum number of hours for registration is one. However, students on assistantships must sign up for a minimum of 3 hours in their final semester, and to be exempt from FICA and Medicare taxes during summer sessions.

Registration for PLSC 500 Thesis and PLSC 600 Dissertation Hours

The academic program of each MS (thesis portion) graduate student must include a minimum of 6 hrs of **PLSC 500 Thesis**. During the semester in which your thesis is accepted, you must be enrolled in 3 hrs of **PLSC 500**. The official policy of the UTK GS is that master's students should be enrolled in one or more hours of **PLSC 500** during every semester that they work on their thesis, use UTK facilities and/or consult with their major professor about their research. Students may register for up to 15 thesis hours. After receiving the master's degree, a student is no longer permitted to register for **PLSC 500**.

PhD students must register continuously for course **PLSC 600 Doctoral Research/Dissertation** (minimum of 3 hrs) each semester from the time the doctoral research proposal is approved, admission to candidacy is accepted, or registration for course **PLSC 600** is begun, whichever comes first, including summer semester and the semester in which the dissertation is approved and accepted by the GS. A minimum total of 24 hrs of course **PLSC 600** is required before the dissertation will be accepted. A student who will not be using faculty services and/or university facilities for a period of time may request leaves of absence from dissertation research up to a maximum of six terms (including summer terms). The request, approved by the major professor, will be submitted by the student and filed in the Registrar's Office (see page 34 "Leave of Absence").

3. Graduate advisory committees

M.S. and PhD graduate advisory committees are usually established within the first semester of enrollment. Once the graduate advisory committee membership has been established, *students are expected to schedule annual committee meetings* with their graduate advisory committee. The student's major professor, in consultation with the student's graduate advisory committee, will determine whether appropriate progress has been made during the prior year and will provide the Plant Sciences Graduate Committee chair with a narrative for the student and committee to serve as annual recorded progress (*see Appendix A*).

Please note: Each student's advisory committee *differs* from the Plant Sciences Departmental Graduate Committee, whose members are listed at the front of this handbook. The Department of Plant Sciences Graduate Committee is charged with ensuring that PS graduate students progress satisfactorily toward completion of their specific project or research goals and are enrolled for relevant coursework at UT (*see Appendix A*).

Master's advisory committee

Each student will have a graduate advisory committee consisting of a major professor and at least two faculty members at the rank of assistant professor or above. If the student has a declared minor, one of the committee members must be from the department of the minor field. The student, in cooperation with the major professor, should identify and recruit faculty members to serve on the graduate student's advisory committee by the end of his/her second semester in

graduate school. The purpose of this committee is to assist the student in planning a course and research program to ensure fulfillment of degree requirements. The advisory committee must sign the Admission to Candidacy form for Masters degree candidates to submit to the Graduate School prior to the prior semester in which they plan to graduate.

Doctoral advisory committee

The Graduate School requires that the student's doctoral committee "be composed of at least four faculty members, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from a department other than that of the student's major field." The student, in consultation with his/her major professor, should suggest a list of names to the Department Head for approval by the end of the second semester in graduate school. The committee is responsible for administering Comprehensive Examinations (written and oral) and certifying the student's mastery of the major and collateral fields. In addition, the committee must approve all course work applied toward the degree, certify the student's defense of the dissertation, and recommend the dissertation for acceptance by the Graduate School. The advisory committee must sign the Admission to Candidacy form for Masters degree candidates to submit to the Graduate School prior to the prior semester in which they plan to graduate.

4. Proposed program of study

Each student, in cooperation with the major professor, should develop a proposed program of study by the end of his/her second semester in graduate school. The student should then schedule a meeting of the advisory committee to review, revise and approve his/her graduate program. In planning this program the student should pay particular attention to the Graduate School requirements for the M.S. degree.

For Ph.D. Candidates, once a student enrolls in PLSC 600, continuous enrollment is required each semester (including summer) through completion of the degree **and** students must enroll for 3 credit hours of PLSC 600 during the semester in which they intend to graduate.

5. Research proposal

Each student must submit a written proposal for the research problem or creative achievement to be undertaken in his/her graduate program. A topic should be identified and a proposal prepared and submitted to the student's graduate advisory committee no later than the third semester (not counting summers) in graduate school. A student who does not submit the thesis proposal by the end of the first year of study is considered to be making unsatisfactory progress, and may have their assistantship terminated.

During the research proposal stage, students should determine the equipment, supplies, time and other resources required for successful completion of the project,

and should ensure that they have adequate training and access to the equipment, as well as funding for other required resources. This planning component of the research is done in close consultation with the major professor or academic advisor.

After the student and major professor have refined the proposal to their joint satisfaction, copies should be distributed to the student's advisory committee. The student should then schedule a meeting of the committee to receive suggestions and direction on the proposed research plan. Typically, the graduate student will present a departmental seminar describing the proposed research. The process works most efficiently when the graduate student's advisory committee is able to review the research proposal and proposed program of study during the same meeting.

6. Reasonable term of study & time limits for graduate degrees

The "normal" period of time required to complete a graduate program for a 'full time' graduate student in Plant Sciences often varies with the complexity of the chosen research or project and varies among major professors. As a general guideline, graduate degrees may be completed in two to three years for Master's students and three to five years for doctoral students following admission to the program.

There are specific time frames within which graduate students must complete their degrees or they will be withdrawn from graduate school. Candidates for the master's degree have six calendar years to complete the degree, starting at the beginning of the semester of the first course counted toward the degree. Candidates for doctoral degrees must complete all comprehensive examinations within five years of their matriculation, and all requirements must be completed within eight years from the time of a student's first enrollment in a doctoral degree program.

Graduate students are responsible for meeting the requirements established for the M.S. and Ph.D. degree programs that are *in effect at the time that the graduate student successfully achieves candidacy* for the degree they are pursuing. Candidacy is formalized by submitting the appropriate Application to Candidacy forms (see:

[\[http://gradschool.utk.edu/gradforms.shtml\]](http://gradschool.utk.edu/gradforms.shtml)

7. Participation in research projects

Master's (thesis option) and Ph.D. students are required to submit a thesis or dissertation containing the results of original research. In addition to thesis or dissertation research, students might be encouraged to participate in other research projects of their major professor. Many routine and specialized methods and techniques used in research are not taught in the classroom. Exposure to and participation in diverse research topics are considered essential parts of graduate education. Students on graduate research assistantships are employees of the University and usually work full-time during the summer months and between semesters and part-time during the fall-spring academic year. Graduate students not supported by assistantships are often expected to participate in research projects, in addition to their thesis or dissertation project.

Specific requirements will vary among research projects and the student's course of study. Each research project has different objectives and work load requirements.

The student and the major professor should establish, at the beginning of the graduate program, what the student's contribution will be in project research.

GRA and GA work responsibilities may include:

- Students individual thesis or dissertation research, once agreed upon by both student and major professor. A student's research project is considered to have priority over most other research work.
- Other research and duties as defined by the major professor

GTAs may perform similar duties in addition to their teaching responsibilities.

8. Evaluation of student progress

Graduate student progress will be evaluated once per year by the major professor in consultation with the student's graduate advisory committee members. Students must maintain a 3.0 grade point average and receive a satisfactory review of progress by the student's graduate advisory committee. The review is intended to annually document discussions between the student and the major professor and should be copied to the chair of the Plant Sciences Graduate Committee. Once the graduate program and project, thesis or dissertation topic have been determined, the student is required to schedule an annual committee meeting to review the student's program and plan of work (See **Appendix A. Suggested Milestones for Planning Graduate Study**).

Flexibility within the graduate program allows variation among individual courses of study, but students are expected to make satisfactory progress in acquiring knowledge of a subject area and in completing degree requirements. The student and major professor should have a mutual understanding of what each is expected to contribute to the program of graduate study. A student's graduate study may be terminated if progress is unsatisfactory. Appeals normally are made through the Department Head to the University administration. The Graduate Council Appeal Procedure should be consulted. The student handbook, *Hilltopics*, includes UTK standards of conduct, policies on disciplinary action, and procedures for appeals.

Retention Standards. Graduate education requires continuous evaluation of the student. This evaluation includes not only periodic objective evaluations, such as the cumulative grade-point average, performance on comprehensive examinations and acceptance of the thesis or dissertations, but also completing other milestones in a timely manner (e.g., forming a committee, completion of coursework, submitting a research proposal, making progress in project or research objectives, and thesis/dissertation preparation). Judgments are made by the faculty regarding the student's progress and potential. Continuity in a program is determined by consideration of all these points by the major professor and graduate committee and final decisions are made with input from the head of the academic unit.

Graduate students must maintain a cumulative grade-point average (GPA) of at least 3.0 in all graduate courses taken for a letter grade of A-F. Grades of S/NC, P/NP, and I, which have not numerical equivalent, are excluded from this computation. These policies do not apply to provisional students.

Academic Probation. Upon completion of nine hours of graduate coursework, a graduate student will be placed on academic probation when his or her cumulative GPA falls below 3.0. A student will be allowed to continue graduate study in subsequent semesters if each semester's grade point average is 3.0 or greater. Upon achieving a cumulative GPA of 3.0, the student will be removed from probationary status.

Dismissal. In addition to failure to meet UT Graduate School expectations leading to academic probation (e.g., a student earning <3.0 semester GPA while on academic probation), other reasons for dismissal include failure to make adequate progress towards other degree requirements (e.g., research project, thesis/dissertation preparation), academic dishonesty (e.g., plagiarism, falsification of data), or other forms of gross misconduct as identified by the Office of Equity and Diversity, Human Resources, Dean of Students' Office, Hilltopics, or Graduate Council. Dismissal will be accomplished by written notice to the student with a copy to the Graduate School.

Termination of financial support can occur, and is done by the following process, if performance reviews with your major professor find any of the following:

- a grade of NP in PLSC 500 or 600
- Grades of D or F, or a W without pre-approval of your advisory committee
- Academic probation
- Failure to complete degree requirements within the time frames specified in this Handbook
- Inadequate performance of assigned duties or research activities

Such performance lapses MAY result in termination of financial support. A major professor may initiate this termination of financial support process without involving the Plant Science Graduate Committee by working directly with the Department Head and Graduate Director. This will typically occur when the student is being funded by the major professor, as opposed to departmentally-funded assistantships.

The Department Head, and Plant Sciences Graduate Committee (when involved), have the flexibility to consider any additional factors (including source of financial support) in making a final recommendation. If the department head is in agreement with the major professor and/or Graduate Committee recommendation, the department head sends a written notice of termination of financial support to the student, with copies to the major professor and Graduate Director. In most cases 30-day notice is given, such that the student will receive a final monthly paycheck at least 30 days after written notice is sent. However, if performance is very inadequate, termination can be immediate, even within a semester. For example, this can occur if you are essentially absent from all duties, making no research progress or are not available for assistantship duties. It is strongly recommended that you meet frequently with your major professor to keep them informed of your activities.

9. Resignation from GTA, GRA, or degree program

If circumstances lead you to withdraw from any of these commitments, provide a hard copy letter stating your resignation to the department head and the Graduate Director.

Additional Notes:

- *Not registering for any coursework* in a Fall or Spring semester may lead to automatic termination from the degree program, which would require a readmission decision by the Department, plus payment of any associated readmission fees.
- If you resign during the semester, as opposed to between semesters, you will be **personally** responsible for tuition costs for that semester, even if you have a tuition waiver. Essentially a tuition waiver is given after completion of the semester, not at the beginning.

10. Professional meetings & travel support

Graduate students are encouraged to attend at least one professional meeting during their degree program, and especially to present the results of their research. In general, attendance at professional meetings is at the student's expense. At some professional meetings, reduced registration, hotel rates and other amenities are available for graduate students. In some cases, travel funds are available from the department or individual faculty member's grants for students presenting papers at professional meetings once per year.

Graduate students are expected to apply for supplemental funding from other sources. Graduate students requesting funds in support of travel should be prepared to provide the following statements & information:

- Justification for travel addressing the relationship of the meeting to the student's program with emphasis on how it enhances research efforts or the student's portfolio
- Potential benefits to Department of Plant Sciences, Herbert College of Agriculture & UTIA
- Evidence of application for funding from additional sources
- Letter of major advisor's support
- A detailed budget

Sources of possible funding include travel awards from professional associations that support graduate student efforts, the UT Graduate School (see link below) GSS, and the Herbert College of Agriculture.

In particular, graduate students are encouraged to apply for professional development fund travel grants, which are administered by the Graduate Student Senate. The purpose of these funds is to provide travel grants for UT Knoxville graduate students to make scholarly presentations at professional meetings.

Graduate student eligibility for University Program & Services Fee (UPSF) funds

1. A graduate student may apply to the Travel Fund Advisory Committee if he/she is a full-time, degree-seeking, UTK student. Priority will go to advanced graduate students
2. Major professor & department head must sign the application.
3. Transportation, lodging and registration expenses will be reimbursed from the UPSF Graduate Student Travel Fund. (Due to limited funding, meals are **not** allowed as reimbursable expenses). Reimbursement will be limited to the lesser of \$500.00 or the actual out of pocket expenses which qualify hereunder. The Advisory Committee encourages and considers cost sharing by student, department and/or college.
5. While enrolled at UTK, a graduate student is eligible for a maximum of one travel award per year from the UPSF Graduate Student Travel Fund, however, recipients may not receive more than one award from the UPSF Graduate Student Travel Fund each academic year.
6. The UPSF Graduate Student Travel Fund Advisory Committee, at its sole discretion, reserves the right to waive/modify any or all of the eligibility requirements contained herein.

For forms & information, visit w/<http://gss.utk.edu/travel-awards/>. To receive notifications of deadlines by email, join the **GradNews** listserv by emailing your request to gss3@utk.edu

Deadlines for UPSF applications posted online are final and are approximately:

<u>For Travel Beginning</u>	<u>Application Deadline</u>
Fall: Sept 1 to Jan 12	24 Aug
Spring: Jan 13 to Apr 29	21 Dec
Summer: Apr 30 to Aug 31	18 Apr

Many professional societies have graduate student competition for the best presentation and reward outstanding students with monetary prizes. The Department of Plant Sciences has established a fund to match graduate student awards. Policies concerning distributions from this fund are given in Appendix A.

11. Preparation of manuscript(s)

Scientists are expected to publish research results in peer-reviewed journals. The number and quality of these publications are often important factors for career

advancement and reward. Each graduate student is expected to prepare manuscript(s) of his/her research results or non-thesis M.S. projects for publication. M.S. (thesis) and PhD students should study peer-reviewed professional journals for style and content prior to writing the thesis or dissertation. The thesis or dissertation can be written in such a way (manuscript format) as to allow easy extraction for professional publication. Alternately, the thesis or dissertation may be a compilation of peer-reviewed papers written by the graduate student that are published, in press, or in review.

Authorship of manuscripts should be according to the contribution of each to the overall project. Typically, the graduate student will be listed as first author on a publication that results from the research in his/her thesis dissertation. If the student does not take initiative in writing the manuscript(s), however, the major professor may become primary author.

Ph.D. students are also encouraged to undertake, as first author, preparation of a review paper for submission to a scholarly journal. Comprehensive papers like these, that review existing literature within the student's area of expertise, provide an exercise in organization and clarify knowledge across the field. Such papers can also give new professionals prominence in the field as they are often highly cited by other scientists.

12. Preparation of grant proposal(s)

Graduate students are encouraged to gain experience in preparation and submission of competitive grant proposals in pursuit of funds to conduct research, teach or offer novel outreach experiences to diverse audiences. Graduate students are encouraged to participate in preparing full or parts of proposals with their major professor and colleagues and should work closely with their major professor when preparing pre-proposals or grant applications.

Please note: Graduate students **may not** directly submit proposals to funding agencies. Be aware that The University of Tennessee requires a particular set of forms and procedures be used in preparation of grant proposals. UT maintains a professional staff of experts to assist with this process. Please inform your major professor of intent to prepare a grant proposal & work together to fulfill these requirements.

13. Graduate student teaching policy

Graduate Teaching Assistants (GTAs) will be assigned by the Department Head to assist faculty in teaching courses. Normally GTAs have a teaching responsibility each semester. Other Plant Sciences graduate students are encouraged to participate in the teaching program by consulting with the student's major professor and the instructor for teaching opportunities in courses offered by the department. One hour of credit may be obtained for each semester of participation in the teaching program. To obtain this credit, the student should register for PLSC 569 "Teaching Practicum" or ANR 512 "Teaching internship in agriculture and natural resources", with approval of the instructor responsible for the course being taught. A maximum of 3 hours credit is possible.

14. Graduate Student Attendance at Departmental Seminars

The Plant Sciences Faculty Seminar Coordinator schedules a weekly departmental seminar during Fall and Spring semesters. Additional seminars may be presented at other times to accommodate the schedule of guest speakers. Students and faculty are expected attend all seminars in the absence of conflicts with other commitments. Attendance may be taken and unexcused absences may merit consultation with the Plant Sciences seminar coordinator, major professor or department head.

15. Project Proposal presentation requirements for graduate students

MS and PhD graduate students are expected to present a "Proposal" or "Status of Research" report, usually in the second semester of enrollment in the PS graduate program. Proposal/Research status seminars are usually scheduled to accommodate 2 students a week, thus should be about 20 minutes long for MS students/about 40 minutes long for PhD students, and should allow an additional 5-10 minutes for a question & answer session after each. Enrollment in PS 504 Seminar is currently NOT Required to fulfill proposal seminar expectations.

Students are expected to provide seminar or proposal titles to the PS faculty seminar coordinator **at least 2 weeks in advance** of the seminar. Exit seminars should also be posted **at least 2 weeks in advance** of the seminar in the semester during which they plan to graduate. Students are responsible for posting written fliers of their seminars on bulletin boards, entrance doors, elevators, and corridor walls of Ellington Plant Science and the Plant Biotechnology Buildings **one week before** their seminars are given. Students are also expected to remind the faculty seminar coordinator that titles are to be emailed to PS faculty and related departments by Wednesday on the week before the seminar is scheduled.

Graduate students are expected attend all departmental seminars both in fall and spring semesters. For students who choose to enroll in PS504, presentations will be graded A-F for each semester enrolled. The student's presentation (if given), attendance, and participation in constructive reviews may be used to calculate grades.

16. Graduate Student Exit (Research) Seminars required by graduate students:

All graduate students are required to present an exit seminar detailing and discussing their MS or PhD project results from their thesis or dissertation research (or special project for non-thesis students). Exit seminars are encouraged to take place during regular seminar timeslots (contact the seminar coordinator, see below) and will generally be longer than proposal seminars (about 40-45 minutes long). Students do not need to be enrolled in PS 504 to present their exit seminar.

Fall Semester Departmental Seminar: [Fridays, 2:30 – 3:30 PM, PBB 160](#)

Faculty Seminar Coordinator(s): [Dr. Eric Walker \(Primary\)](#) and [Dr. Hem Bhandari](#)

Students often schedule exit seminars just before or in conjunction with their formal thesis or dissertation defense. Exit seminars may also be formatted in the style of an oral presentation [to be] given as a presentation at a professional meeting. Regardless, exit seminars are encouraged to occur during the regularly scheduled Departmental Seminar. Furthermore, the exit seminar is considered part of credit given for PS 500/600 (Thesis/Dissertation) and *does not receive additional seminar credit*.

NOTE: Defense seminars may need to be scheduled *in addition to* and *separately from* the Exit Seminar in order to accommodate availability of the graduate student's faculty advisory committee.

17. Statistical aptitude & use of departmental computers

It is expected that each graduate student will enroll in one or more statistics courses to become familiar with statistical methods used in agricultural and biological research. The selection of courses should be discussed with the major professor and approved by the students' Advisory Committee.

The department strives to make sure every graduate student has access to computers and other equipment needed for academic and research purposes. However, we do not have adequate resources to place a computer on the desk of every graduate student. Students should discuss their computer needs with the major professor, who may request one of the departmental computers be made available to the student. Priority will be given to graduate students in the final stage of their program for data analysis and thesis/dissertation writing.

18. Comprehensive preliminary examinations for doctoral students

The comprehensive preliminary examination should be scheduled with appropriate committee members toward the end of the formal coursework requirements for the degree. Normally, this would be after about two-to-three years in the Ph.D. program. The examination must be completed successfully before admission to candidacy for the degree and at least one semester before conferral of the degree. The student's Advisory Committee with the Chair of the Committee administering the examinations will conduct the comprehensive examination. The student is allowed two attempts at passing the preliminary examinations.

When the student and his/her major professor feel the student is ready to attempt comprehensive examinations, the major professor will schedule the written examinations that will consist of questions from each committee member on a topic related to the students field or research. Normally, each examination will require no longer than two days for completion, and all written examinations will be completed within a one or two week period. Each committee member will determine whether his or her questions are to be answered open or closed book. The oral examination should be scheduled only *after* all written comprehensive examinations have completed and passed. The oral comprehensive exam must be passed at least one semester prior to completion of the degree.

Format of the exams

Each member of the student's Graduate Advisory Committee will be asked to submit a list of exam questions to the Chair (major professor). These questions will serve as the written examination for that Advisory Committee member. After each written examination is taken, the Advisory Committee Chair will deliver the student's written response to the originating member. This member will grade the examination and return it to the Chair with the indication of pass or fail. If the student passes all written examinations, the Chair will then schedule an oral examination. The Advisory Committee will serve as the examining committee. If the student passes the oral examination, he/she is eligible and applies for admission to candidacy for the Ph.D. degree.

In the event of failure of exam(s)

If the student fails one or more of the written examinations, the Chair will convene the Advisory Committee to discuss an appropriate course of action. Alternatives that may be considered include: administering another written examination in the area that the student failed, after giving the student additional time for preparation; requiring additional coursework prior to administering an additional written examination in each of the areas failed; or proceeding with the oral examination with the understanding that appropriate remedial action will be required before admission to candidacy.

If the student fails any of the written examination(s) for a second time, the student is dismissed from the graduate program. Likewise, if the student fails the oral examination a second time, the student is dismissed from the program.

Appeals process

If a student feels he/she has been treated unfairly during any stage of the examination process, he/she has the right to appeal to the Department Head. The Department Head will review the examinations in question, seek advice from other departmental members and meet with the student's graduate advisory committee to discuss the student's problems. The Department Head can suggest a re-examination, uphold the decision of the committee, or propose alternative solutions. The Graduate School provides and administers further appeal procedures.

19. Distribution of a final draft of the report, thesis or dissertation to the committee & scheduling oral exams

"The final draft of the non-thesis report, thesis or dissertation must be distributed to all committee members at least two weeks prior to final examination date. Students are responsible for scheduling final oral & written (M.S. non-thesis) exams. All exams must be held at least two weeks before the final date for acceptance & thesis approval by Office of Graduate Student Services on the Graduate Council's behalf."

"A doctoral candidate must pass an oral examination on the dissertation. The dissertation, in the form approved by the major professor, must be distributed to the committee at least two weeks before the examination. The examination must be

scheduled through the Office of the University Registrar at least one week prior to the examination and must be conducted in university-approved facilities. The examination is announced publicly and is open to all faculty members. This examination must be passed at least two weeks before the date of submission and acceptance of the dissertation by Graduate Student Services."

Final thesis or dissertation copies, in paper or digital form must be prepared (at the student's expense) and distributed as required to each member of the committee, the Department Head and as directed for University and Library records.

20. Applying to Graduate

There is a fee associated with applying to graduate that will recur if graduation date extensions are requested. The cost will be \$30 for MS students and \$75 for PhD students. If you do not complete your thesis or dissertation and graduate on time in the semester for which you have applied to graduate, you will have to pay these fees again. Please plan ahead with your Major Professor accordingly.

21. Finished with your degree? Checklist for leaving the department & University.

- _____ Put your name, date and clear labels on all freezer stocks, experimental standards, etc.
- _____ Provide your major professor with backup data and thesis/dissertation text files
- _____ Clear office desk & lab workspaces
- _____ Inform Dawn Seigel of your final date of employment
- _____ Submit to Sandy Kitts a PDF file containing your thesis/dissertation title page, abstract & signed committee page
- _____ Return all university & departmental keys
- _____ Pay all relevant university & departmental fees
- _____ Provide Dawn Seigel with your alumni contact information for forwarding mail, job announcements & referrals

Brief Words about Academic Honesty & Student Conduct

We expect our graduate and undergraduate students to exemplify the highest standards of personal conduct and academic honesty. The *Academic Honor Statement* for all UT Students follows:

"An essential feature of The University of Tennessee is a commitment to maintaining an atmosphere of intellectual integrity & academic honesty."

"As a student of the University, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity."

Consequences of failure to adhere to these principles, including the appeals process, are detailed extensively in ***Hilltopics: the Student Handbook***. For the most recent version of ***Hilltopics***:

<http://hilltopics.utk.edu>

Alcoholic beverage policy

"Drinking or being under the influence of alcohol or illegal drugs while on the job" or "the use, possession, or distribution of alcohol on University property" is a violation of the University work rules and is so stated in the *UT Personnel Policies and Procedures Manual*. Violation of work rules may be cause for disciplinary action including possible termination of employment. As stated in the student handbook, *Hilltopics*, University regulations prohibit "all student organizations from serving or permitting the consumption, possession or display of any alcoholic beverage or containers at any time, or by anyone on University premises." The "use, possession, or being under the influence of alcoholic beverages on University-owned or controlled property" is a violation of the Standards of Conduct as defined in *Hilltopics*.

Illegal drug policy

A statement of policy related to illegal drugs is contained in the *UT Personnel Policies and Procedures Manual* and is published each year in the *Hilltopics: Student Handbook*. The "Drug-Free Campus and Workplace" Policy (No. 720) states: "It is the policy of The University of Tennessee to maintain a safe and healthful environment for its students and employees." Therefore, University policy prohibits the unlawful use, manufacture, possession, distribution, or dispensing of drugs ("controlled substances" as defined in the Controlled Substances Act, 21 U.S.C. 812) and alcohol on University property or during University activities.

"Violation of this policy is grounds for disciplinary action—up to and including immediate discharge for an employee and permanent dismissal for a student. Federal and state laws provide additional penalties for such unlawful activities, including fines and imprisonment" (21 U.S.C. 841 et seq.; T.C.A. 39-6-401 et seq.). Local ordinances also provide various penalties for drug and alcohol-related offenses. The University is

bound to take all appropriate actions against violators, which may include referral for legal prosecution or requiring the individual to participate satisfactorily in an approved drug use/alcohol abuse assistance or rehabilitation program.

"Individuals who are paid by The University of Tennessee from federal grants or contracts must notify the University of any criminal drug statute conviction for a violation occurring in the workplace within five days after such conviction. The University is, in turn, required to inform the granting or contracting agency of such violation within ten days of the University's receipt of notification."

"Employees and their families needing treatment information should call their local Human Resources Office, Employee Assistance Program, or the State of Tennessee Employee Assistance Program (800-468-8369)." Students needing treatment information should contact their campus Student Affairs Office, student health center, or counseling center.

The following acts are violations of the Standards of Conduct as defined in the student handbook, **Hilltopics**: "Unlawful use, manufacture, possession, distribution or dispensing of drugs or alcohol on University-owned or controlled property or during University activities." A violation of the Standards of Conduct may result in permanent dismissal from the University.

Plant Sciences Departmental Facilities & Resources

Overview

Facilities available in the department include offices and laboratories, greenhouses and growth chambers, facilities for sample preparation, field laboratory buildings and fields at Knoxville and on Branch Research and Education Centers.

The Plant Science Department office and laboratory space is located in the Plant Biotechnology Building and Ellington Plant Sciences Building in Knoxville. Greenhouses are located near these campus buildings. Office & desk assignments for graduate students are assigned office and desk space as near as possible to their major professor.

Field research facilities are located approximately 4 miles from the campus in Knoxville, consisting of a headquarters building and 212 acres of land. The headquarters building has facilities for drying samples and for storage and handling of agricultural chemicals.

Research is also conducted at 14 Research and Education Centers across the state. Professional staff and academic faculty are located at 3 of these centers (Jackson, Greeneville & Knoxville), and technical personnel are located at each center to assist with research. Graduate students and faculty will coordinate each field experiment by preparing a formal *work plan*, which outlines the research, the resources required, and the contribution of each party in the experiment. The work plan must be signed by the principal investigator and include the names of those involved in the proposed research, at which time it becomes a working paper covering experimental procedures.

Departmental & University vehicle use

GRA or GTA duties may involve driving vehicles, for the purpose of attending meetings, accomplishing research or performing service (giving talks, visiting growers, etc.). Students must have a valid U.S. driver's license in their possession while driving.

The department has several vehicles available for official use in the conduct of research, extension, and educational activities. Use of the vehicles must be scheduled through the Departmental Vehicle Coordinator (currently Dawn Siegel), and departmental guidelines for vehicle use must be followed.

- Upon returning from a trip - remove all items including drink cans, lunch & food wrappers, etc., & all equipment & supplies
- **You** are responsible for removing excess dirt, dust & mud that is present after your use, *whether inside or outside of vehicle*
- If soil, pots, sand, or other debris is hauled in trucks, the driver must clean the truck bed before putting away the vehicle
- Vehicles are to be refueled and oil checked upon returning to campus whenever the fuel gauge reads one-half full or less.
 - UT motor pool is open 7:00 a.m. - 11:30 p.m. Monday -Friday
- Reported problems, broken parts, strange noises, malfunctions, etc., **immediately** to Administrative Supervisor (currently Dawn Siegel)

The University also maintains a motor pool for official travel. Vehicles from the motor pool must be scheduled in advance of the anticipated usage date, and a vehicle request form must be submitted prior to utilizing the vehicle.

In order to operate University owned vehicles, the operator must be an employee of the University and must have a valid U.S. driver's license. It is expected that the driver will obey all traffic laws and regulations. Violations are at the offender's expense and may result in disciplinary action by the department, including suspension of Department of Plant Sciences and University vehicle usage.

What to do in a vehicle-related emergency

If there is an injury - call 911. If an accident occurs always get a police report. Usually, the Voyager card can be used for minor repairs when out of town. However, should an emergency occur where the "Voyager" card cannot be used you may call the UT Motor Pool at (865) 974-2134: 6:30 am - 11:30 pm

For emergencies from 11:00 p.m. to 7:00 a.m., you may call UT Safety and Security at 974-3114. This number will get a tow-in only. You may also call Chestnut Street Wrecker Service (Knoxville locale) at (865) 637-0103.

For further safety precautions call 911 and request that police come to where vehicle is broken down.

RIGHT-TO-KNOW program

Employees and students of the University of Tennessee must be protected from exposures to hazardous chemicals through a combination of safety training and safe practices in the work place. A hazardous chemical is defined as any chemical that poses a physical hazard (fire, explosion, corrosion, reaction, etc.) or health hazard (toxin, irritant, carcinogen, mutagen, etc.) as defined in the OSHA Right-to-Know Law. Three laws govern the use of hazardous chemicals in University work places:

- The Right-to-Know Law applies to all uses of hazardous chemicals that are not on a laboratory scale. Areas covered by the Right-to-Know Law include shops and manufacturing facilities. All persons in the work place must be trained regarding all hazardous chemicals in the work place prior to assignment, and at least annually thereafter. A material safety data sheet (MSDS) must be on file for each hazardous chemical and all containers must be labeled. All necessary safety equipment must be provided and used. Refer to Sections 3 and 9 of the Institute of Agriculture Health and Safety Manual.
(<http://biosafety.utk.edu/biosafety-program/resources/manuals/>)
- The Laboratory Safety Standard applies to chemical manipulations carried out on a "laboratory scale" as defined in the OSHA regulations, which includes most University laboratories. A Chemical Hygiene Plan must be developed for each procedure, material safety data sheets (MSDS) must be on file for all hazardous chemicals, all persons conducting the procedure must be trained to do the job properly and safely prior to performing the procedure, and all necessary safety

equipment must be provided and used. Refer to Sections 3 and 9 of the Institute of Agriculture Health and Safety Manual.

- The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) regulates the use of all pesticides. The Institute of Agriculture Pesticide Management Policy specifies the training and pesticide use requirements that apply to all employees and students of the Institute of Agriculture. All pesticide use must be conducted by, or under the direct supervision of, a certified applicator. All necessary safety equipment must be provided and used. Refer to Section 40 of the Institute of Agriculture Health and Safety Manual.

For more information, contact the work supervisor, department head, or the Institute of Agriculture safety officer (865.974.1153).

Accident and incident reporting

All accidents and incidents must be reported immediately in accordance with University policies and procedures. Failure to report an accident may result in loss of Workers Compensation benefits. Failure to report unsafe conditions may result in future injuries and/or property damage. To report an accident, incident, or unsafe condition, contact the work supervisor, department head, or the Institute of Agriculture safety officer. Refer to the following sections of the Institute of Agriculture Health and Safety Manual: the accident reporting guidelines inside the front cover and Section 10.

Official University travel

With approval of the major professor, graduate students may request authorization for travel on official business at University expense. The graduate student is expected to conduct him/herself in a professional manner at all times, and to abide by all rules and regulations pertaining to official business. A copy of the University Travel Policy may be found at: <http://treasurer.tennessee.edu/travel>.

Students should consult with the major professor before initiating travel, concerning procedures and forms needed for reimbursement of expenses. Authorization for official travel must be obtained by properly executing an "Authorization for Official Travel" form.

Out-of-state travel

For out-of-state travel, authorization forms should be submitted at least 3-5 working days before desired departure date so that travel can be entered into the IRIS system. When overnight travel is involved, the University may pay expenses (see university travel regulations for limits regarding meal and lodging reimbursements). Allowable travel expenses may be less than charges incurred at hotels, etc. Limits on travel expenses do not indicate amounts that *should* be spent. These are *maximum* amounts above which reimbursement cannot be made. University employees should be as conservative as circumstances permit in expending funds for official travel. For example, work-related travel is generally by automobile. The most economical motel at a particular location should be selected.

Requests for reimbursement for travel expenses must be submitted on an official UT Expense Account form. Motel/hotel receipts, registration fee receipts, etc., must accompany the completed form. Contact Jake Nelson (currently responsible departmental secretary) for access or help with these forms. Requests for reimbursement of expenses for travel should be cleared through the Business Office within 30 days after the completion of travel.

Our bookkeepers can be consulted and will provide information and links to UT policies, including those for expense reimbursement (out-of-state & in-state) travel.

Avenues of communication

Announcements pertaining to job opportunities, assistantships, travel, etc., will be posted on bulletin boards outside departmental offices. Mailboxes for all departmental personnel are located on the second floor. Room 252 Ellington Plant Sciences Building in the main office suite of the Department of Plant Sciences.

Graduate students are also encouraged to join and participate in the UT Graduate Student Association. Meetings are held on main campus and, along with periodical social gatherings, often include discussion of academic and recreational opportunities.

Grounds for withdrawing financial support

Failure to meet deadline dates in a degree program sequence may be grounds for loss of financial support. Students on work-related assistantships may be evaluated in writing by their faculty work supervisor at the middle and end of each semester. The student may be notified in writing of their work performance, and may respond to this evaluation. The student may be placed on financial-support probation at the mid-point or end of any semester for poor work performance, poor academic performance, or excessive dropping of courses. If after 6 weeks, satisfactory work performance has not been achieved, financial support will be withdrawn.

Departmental grievance procedure

In the event that a graduate student has a grievance and the issue(s) cannot be resolved between the student and major professor, the student is urged to discuss the matter with his/her graduate student advisory committee. If the student is not satisfied with the decision of the committee, he/she can contact the department head to determine if further action is warranted. If the department head is unable to resolve the issue, he may appoint a special committee composed of two faculty members (not members of the student's academic committee), a student representative, and the department head, to conduct an impartial hearing. Further appeal may be made by the student as outlined in the guidelines established by the University and published in *Hilltopics*, see (<http://hilltopics.utk.edu>) regarding "Graduate Student's Rights and Responsibilities."

Students and department faculty abide by these guidelines and those published in the Faculty Handbook in the section on "UTK Teaching-Learning Guidelines."

Additional resources for student problem resolution

Issues related to academic coursework:

Issues related to grades or academic course work should first be addressed with the course instructor, then the appropriate department head, and finally the dean of the college in which the course is offered. If an appropriate solution cannot be reached through discussions with these individuals, the Associate Dean of Graduate Studies can offer assistance regarding the best "next steps" for problem resolution.

Issues related to academic advising should be addressed first with the advisor, then the director of the appropriate advising center, then the dean of the appropriate college.

Issues related to campus life:

Comments and concerns related to campus life, student organization, or student interests should be directed to the Dean of Students Office. Staff in this office will assist in resolving a concern or identifying the appropriate channel of appeal.

Students unsure how to initiate the problem resolution process may contact the Dean of Students (974-3179), the Associate Dean of Undergraduate Academic Affairs (974-3564), or the Associate Dean of Graduate Studies (974-3251) for assistance in determining the appropriate administrative channels of appeal.

Several offices provide support and guidance for students pursuing resolution of University-related problems. These roles of these staffs include: (1) exploring problems encountered by individual students, (2) informing students of appropriate administrative channels utilized for problem resolution, and (3) working to address broader issues and policies that impact all students.

Students are encouraged to visit any of the following offices, which are open from 8:00 a.m. - 5:00 p.m. Monday through Friday, to share concerns and ask for assistance:

Associate Dean of Undergraduate Academic Affairs (401 Student Services, 974-3564). The Office of Undergraduate Academic Affairs is committed to supporting students and helping with the integration of student and academic life. This office provides support for students in the early undergraduate years and leadership opportunities for upper class students. The Associate Dean maintains effective working relationships with the undergraduate colleges and has a unique understanding of the academic problem students face.

Associate Dean of Graduate Studies (218 Student Services, 974-3251). The Associate Dean of Graduate Studies is available to assist graduate students who are experiencing difficulties or want to express academic concerns related to their graduate programs.

Dean of Students (413 Student Services Building, 974-3179). The Dean of Students Office sponsors and coordinates activities that focus on student

growth and development outside of the classroom. This office advocates on behalf of all students, supplements existing channels of appeal, and helps students to resolve problems in a variety of areas.

Office of Equity and Diversity (1840 Melrose Avenue, 974-2498). The Office of Equity and Diversity assists the University community in its goal to affirm diversity as an opportunity for personal growth and development. OED provides resources and services for the enhancement of diversity programs campus-wide. In addition, OED works with members of the University community who wish to file a complaint of discrimination or sexual harassment. All complaints receive private and immediate attention.

Conflict Resolution Program (916 22nd Street, 974-4736). The Conflict Resolution Program provides mediation services whereby people having conflict can work with a neutral third party to resolve their differences. The Conflict Resolution Program also offers seminars, internship opportunities, and consultation for individuals or groups. Services are available to students, faculty, and staff. They are voluntary and confidential.

Dean, Herbert College of Agriculture (126 Morgan Hall, 974-7303).

Office of Disability Services (191 Hoskins Library, 974-6087). If you need course adaptations or accommodations because of a documented disability or if you have emergency information to share, please contact the Office of Disability Services. This will ensure that you are properly registered for service.

Ag Campus & University Facilities & Resources

UT VolCard (Student ID Card)

All students, faculty, and staff are required to have a valid I.D. card (VolCard). This card is essential for use of various University facilities and programs including the libraries, TRECS, VolPrint, University check cashing facilities and all athletic events. The AllStar Plus Campus Wide Debit account can be activated with a deposit, which will allow the card to be used for vending, laundry and purchases at the UT Bookstore.

There is a charge for replacement of lost or stolen I.D. cards.

VolCard Office, 974-3430
472 S. Stadium Hall
<http://web.utk.edu/~volcard>

Parking on campus

Graduate Students are required to purchase a hangtag permit to park on the Ag Campus, either in Lot 66 or in Lot 68 (CFN1). Parking permits may be purchased online: visit **Parking Services Homepage** [<http://web.utk.edu/~ps/>]. Please refer to **Parking Regulations** [<http://web.utk.edu/~ps/regulations.html>].

On campus & local bus service

Graduate and Undergraduate students may ride UT's bus transportation for free. On weekdays, when the university is in session, the "T" bus service includes an East-West Route that transits to and from the Ag Campus about every 5 minutes from 7:00 a.m.- 4:00 p.m. and every 10 minutes from 4:00 p.m. - 6:00 p.m. The Ag Express runs weekdays from 9:45 a.m. to 2:30 pm. Schedules & routes are subject to change, for latest schedules, see **Knoxville Area Transit (KAT) Website**: <http://ridethet.utk.edu/>.

[For additional information about local transportation, see:

Parking Services Transportation <http://web.utk.edu/~ps/smarttrips.html>]

Library facilities

The Agriculture-Veterinary Medicine Library (<http://www.lib.utk.edu/agvet/>) is located across the street from Ellington Hall. Several literature searches and collections are available for research purposes. Additional reference material is available in Hodges Library on main campus (<http://www.lib.utk.edu/>).

Software access and IT services

UT Students and Plant Sciences graduate students have access to a wide range of computer software and support. For complete information about these resources, visit the Office of Information Technology webpage.

Access to several software programs is available free to UT students on a UT server. Software programs include Amos, ATLAS.ti, Clementine, EQS, HLM, LISREL, NUD*IST, NVivo, NVivo Merge, Mathematica, Origin, PolyAnalyst, QDA Miner, Scientific Notebook, SigmaPlot, Stata SE, Stat Transfer, SUDAAN, TextAnalyst, WordStat.

For access to these resources, go to: <http://oit2.utk.edu/helpdesk/kb/entry/1335/>

Statistical consulting center

Plant Sciences Graduate students are encouraged to utilize the Statistical Consulting Center services to enhance the quality of their research

<https://oit.utk.edu/Pages/default.aspx>. Students are strongly recommended to schedule a brief meeting with a consultant as early in the project as possible.

Consultants are available to work with students to effectively design experiments, apply analytical methods, and interpret results. Consultants can also help with web surveys, text analysis, data mining, graphics, visualization and mathematics. If necessary, consultants can provide responses to address journal reviewer or editorial concerns. At this level, co-authorship of manuscripts is often appropriate.

To ensure that you, your committee and your statistical consultant working toward the same solution, it is a good idea to arrange to have your major professor present at the initial meeting with the consultant so that there is consensus about the appropriate analytical methods chosen.

For most UTK students, the Technology Fee covers the cost of Statistical Consulting services for up to 10 hours per semester. Beyond that, the Fee provides a subsidized rate of \$20 per hour.

Each semester OIT and the Statistical Consulting Center offer seminars on research computing. For details about the seminars, see the Data Analysis Training Classes at <http://oit.utk.edu/training>.

OIT Support Line: (865) 974-9900
Walk-in Consulting at 104 Aconda Court
8:00am - 5:00pm Monday-Friday
<https://oit.utk.edu/Pages/default.aspx>

Thesis writing workshops

Thesis writing workshops are offered each Fall and Spring semester by the Graduate School. Dates are announced at the beginning of each semester on the Graduate School web page: <http://gradstudies.utk.edu>.

University housing

The Department of University Housing provides modern residential facilities that can be rented at modest cost. Off-campus housing is available at various prices and distances from campus. Housing assignments in these communities are made on a first-come, first-served basis, according to the date the student's application materials are received. Requests for transfer are processed when space becomes available, and after all first-time applicants have been satisfied. Information about University and off-campus housing can be found at: <http://uthousing.utk.edu/>.

Keys to UT facilities

Graduate students are assigned keys for Plant Science Buildings, laboratories and greenhouses they will be working in. To obtain keys, please fill out key request forms with the principal secretary in PS. Keys will be cut and signed for at Aconda Court and

students will have to pick them up personally. For security purposes, our students are expected to maintain a very exclusive and intimate relationship with their keys!

Campus police

The University of Tennessee police officers are duly commissioned State of Tennessee, Knox County and Knoxville City police officers. As such, UT Police officers have full police powers in the City of Knoxville, Knox County and on any other property contiguous to property of The University of Tennessee.

The University of Tennessee Police Department provides basic police services to Tennessee's largest university. The department's main objective is to provide a safe campus for students, staff, faculty and visitors. UT Police officers perform a variety of tasks, which include: Investigation of criminal activity, apprehension of criminals, accident and fire response, traffic enforcement, money transports and security for special events. The UT Police Department also offers posters, brochures, and seminars on a variety of topics; property engraving; statistical information; and many other services through the UT Crime Prevention Program. The UT Police Department reports to the Senior Associate Vice Chancellor for Finance and Administration.

UT Police Department
1101 Cumberland Avenue
Knoxville, Tennessee 37996
Telephone: (865) 974-3114 (*non-emergency*) or (865) 974-6631
Emergency: 911
Web Page: www.utpolice.org

UT Intercollegiate athletics & student organizations

UT students have access to an extensive diversity of intercollegiate athletics and student organizations. Many of these are detailed in ***Hilltopics; the Student Handbook***. View the most recent version of ***Hilltopics*** at:

<http://hilltopics.utk.edu>

Appendix A. Suggested Milestones for Planning Graduate Study

You are advised to carefully plan your study so that you can graduate at a targeted term.

Milestone	Responsible		Date completed
	person	Suggested timeline	
Complete UT RCR Certification & Chemical Safety Training	ST	1st semester	_____
Form graduate advisory committee (GAC)	ST & ADV	2nd semester	_____
Coursework & study plan	ST & ADV	2nd semester	_____
1st GAC meeting	ST	2nd semester	_____
Meet w AgVet Librarian to plan for research literature search	ST	End of 2nd semester	_____
2nd GAC meeting	ST	4th semester	_____
3rd GAC meeting	ST	6th semester	_____
Progress review	ST & ADV	Each December	_____
GAC approval of written MS thesis proposal	ST	No later than 3rd sem	_____
Application to MS candidacy	ST	3rd semester	_____
GAC approval of written PhD dissertation proposal	ST	No later than 5th sem	_____
Comprehensive exam*	ST & ADV	No later than 4th sem; ~after classes are taken	_____
Application to PhD candidacy	ST	3rd semester	_____
Submit MS Graduation Application to Graduate School	ST	3rd semester	_____
Submit PhD Graduation Application to Graduate School	ST	5th semester	_____
Schedule thesis defense with GAC	ST	4th sem, check deadlines	_____
Schedule dissertation defense with GAC & graduate school	ST	6th sem, check deadlines	_____
Submit thesis/dissertation to GAC	ST	2 wks before defense	_____
Reserve room for defense	ST	Right after defense schedule is confirmed	_____
Announce the defense to public	ST	At least one week before defense	_____
Final thesis/dissertation defense	ST	Check deadlines	_____
Notify graduate school the outcome of defense	ST & ADV	After defense	_____
Submit final thesis/dissertation	ST	After revisions & GAC approval	_____
Submit all research notebooks, data & electronic files to advisor	ST	Post thesis/dissertation submission; evaluate embargo option	_____
Complete checkout list & exit interview with Department Head	ST		_____

APPENDIX B.

Plant Sciences Graduate Student Award Incentive Program

What Is It?

In 2004, Plant Sciences Faculty and donors established a Plant Sciences Departmental Account allowing us to reward exceptional efforts of PS graduate students who win monetary prizes for oral & poster presentations at Regional, National, & International professional meetings. The Award Incentive Program will match (up to \$300) monetary prizes awarded to PS graduate students.

Why It Was Established:

- This program is intended to promote Professional Association membership and encourage student participation in oral & poster competitions at Regional, National, & International professional meetings (*to see a list of several organizations that extend these types of opportunities, visit http://plantsciences.utk.edu/grad_award_match.htm*)
- As peers, PS Faculty would like to acknowledge the exceptional accomplishments of our graduate students
- We expect this program to help showcase the successes of the PS Department

Current Limitations:

This new program has limited resources from which matching award funds are drawn. At least initially, we must limit the program.

- At present, only Plant Sciences MS and PhD Students whose Major (advising) Professor is from Plant Sciences are eligible for matching awards
- The Department of Plant Sciences' Account will match individual awards up to \$300 per year per student project
- In the case of team-projects, award match applies only to the presenter
- Matching funds do not apply to Department, Institute or University awards
- Matching funds do not apply in the case of travel, scholarship or fellowship awards
- At least initially, awards from State-based professional associations are not eligible to receive matching funds
- Currently we limit awards to 3 per student on separate projects undertaken during each graduate Plant Sciences degree program

How It Works:

- PS graduate students must win a cash award for an oral or display presentation given at Regional, National, and International professional meetings
- Students who win awards should work with their Major Professor and the PS graduate coordinator to initiate the process with the help of PS Department accountants
- Miscellaneous income sources (per individual) are legally limited to \$300 per year
- The award must be taxed as regular income
- If the recipient is an active UT employee (student worker or on-assistantship) they must be paid via the UT Payroll System using an Additional Service pay form. If the recipient is not a UT employee, they must submit a T-27 form through PS Accounting Office

For more information, visit: http://plantsciences.utk.edu/grad_award_match.htm

To begin requisite paperwork to establish a matching award, contact Dr. Bill Klingeman, 974-7964 or wklingem@utk.edu

APPENDIX C. Important Web Sites

Academic Calendar: http://registrar.tennessee.edu/academic_calendar/

Best Practices in Teaching: <http://gradschool.utk.edu/training-and-mentorship/bpit/>

Biohazard Safety and Training: <http://biosafety.utk.edu>

Bursar's Office: <http://web.utk.edu/~bursar>

Campus bus: <http://ridethet.utk.edu/route-information/>

Canvas: <https://oit.utk.edu/instructional/tools/online/canvas/default.html>

Career Services: <http://career.utk.edu>

Center for International Education: <http://international.utk.edu/>

Chemical Safety and Training: <http://safety.ag.utk.edu>

Counseling Center: <http://counselingcenter.utk.edu>

Current UT Travel Policies: <http://treasurer.tennessee.edu/travel/>

PLSC Graduate Handbook: <https://ag.tennessee.edu/plantsciences/Pages/graduate.aspx>

PLSC Graduate Student Evaluation Form: TBD

PLSC Graduate Student Progress Report form: TBD

Financial Aid: <http://onestop.utk.edu/financial-aid>

Plant Science Department: <https://ag.tennessee.edu/plantsciences/Pages/default.aspx>

Funding, Fellowships, Assistantships for Graduate Students:
<http://gradschool.utk.edu/graduate-student-life/costs-funding/>

Graduate Admissions: <http://gradschool.utk.edu/admissions/>

Graduate Catalog: <http://catalog.utk.edu>

Graduate School: <http://gradschool.utk.edu>

Graduate School **Forms**: <http://gradschool.utk.edu/forms-central/>

Graduate Student Appeals Procedure:
<http://gradschool.utk.edu/documents/2016/02/student-appeals-procedures.pdf>

Graduate Student Senate: <http://gss.utk.edu>

Graduation **Deadlines**: <http://gradschool.utk.edu/graduation/graduation-deadlines>

Health Insurance: <http://studenthealth.utk.edu/health-insurance-records-requests/student-health-insurance/>

Hilltopics: <http://hilltopics.utk.edu/>

Hodges Library: <https://www.lib.utk.edu/>

Holidays and Closings: <http://hr.tennessee.edu/benefits/holiday-schedule/>

International House: <http://ihouse.utk.edu/>

ITA Testing Program (previously SPEAK®): <http://gradschool.utk.edu/graduate-student-life/ita-testing-program>

Judicial Affairs: <http://web.utk.edu/~osja/>

Office of Equity and Diversity: <http://oed.utk.edu>

Office of Information Technology: <http://oit.utk.edu/>

Office of Multicultural Student Life: <http://multicultural.utk.edu/>

Parking Services: <http://parking.utk.edu/>

Pendergrass Agricultural and Veterinary Medicine Library: <http://www.lib.utk.edu/agvet/>

Registration: <http://registrar.tennessee.edu/>

Research Compliance/Research with Human Subjects: <http://research.utk.edu/compliance/>

Sports and Recreation: <http://recsports.utk.edu>

Student Health: <http://studenthealth.utk.edu>

Student Organizations: <https://utk.collegiatelink.net/organizations>

Thesis/Dissertation Website: <http://gradschool.utk.edu/thesesdissertations>

Tuitions and University Fees: <http://onestop.utk.edu/tuition-fees/>

University Housing: <http://housing.utk.edu>

UT Athletics: <http://www.utsports.com>

UT Police Department: <http://utpolice.utk.edu/>

Vol Dining: <http://dining.utk.edu/>

Vol tickets: <http://bigorangetix.utk.edu/>

VolCard: <http://volcard.utk.edu/>

VolShop: <http://shop.utk.edu/>

APPENDIX D.

GRADUATE COURSES* OFFERED BY THE DEPARTMENT OF PLANT SCIENCES

A complete list of courses available for graduate credit in the Department of Plant Sciences can be found at the following web site in pdf format. Scroll down to Plant Sciences, or use the search function to find Plant Sciences courses.

<http://diglib.lib.utk.edu/dlc/catalog>

***400-level courses cannot be counted toward course requirements available to PhD candidates. Contact the listed faculty or instructor to discuss alternatives that might enable consideration of course content.**

400-Level Courses*:

410 Nursery Management and Production (3) Management methods as applied to retail and wholesale nurseries and landscape contracting firms. Methods of producing liners, container and field-grown woody ornamental plants. *Contact Hour Distribution: 3 hours lecture. Sp, alternate years (odd numbered)*

421 Native Plants in the Landscape (3). Native plants and plant communities as a basis for landscaping and environmental restoration. Weekly lecture coupled with either an outing or service practicum of invasive exotic plant removals or planting of natives. Study and work sites will primarily be demonstration projects of the University of Tennessee Environmental Landscape Design Lab. They include local schoolyard habitats, greenways, wetlands, streambanks, and shorelines. *Recommended Background: 220 or Ecology and Evolutionary Biology 330. Fa, Sp*

429 Field Study of Public Horticulture Institutions (2) Extended 10-12 day field study of various public horticulture institutions such as botanical gardens, arboreta, historical grounds, zoos, conservatories, cemeteries, and nature preserves. *Application and travel fee required. Su*

430 Greenhouse Management (3). Principles of greenhouse operation and management for commercial crop production. Greenhouse construction and operation, crop scheduling and cost accounting. Environmental inputs and cultural practices as they affect plant physiological processes and influence plant growth and development. *2 hours lecture and one 2-hour lab. Sp, alternate years (even numbered)*

434 Fruit and Vegetable Crops (3) Botanical description, geographical distribution, general cultural practices of warm and cool season vegetables, small fruits, and deciduous tree fruits. A Saturday field trip is required. *Contact Hour Distribution: 2 hours lecture and one 2-hour lab. Fa*

435 Field and Forage Crops (2) Agronomic principles of crop production and management. Crop improvement, cropping systems, tillage, fertilization, pest management, harvest and utilization of major field and forage crops. *Contact Hour Distribution: 2 hours. Fa, alternate years (odd numbered)*

436 Plant and Garden Photography (3) Principles and techniques of photography as they relate to plants and gardens. Study of equipment options and field shooting under various weather conditions and in different seasons. *Registration Permission: Consent of instructor. Sp, alternate years (even numbered)*

- 437 Public Garden Operations and Management (2)** Analysis of year-round operations and management of public gardens. Case studies involving time and labor management, budget development and management, implementation of volunteer programs, information dissemination methods for public outreach, management of grounds and facilities using the University of Tennessee Institute of Agriculture Gardens as a model. **Sp**
- 442 Turf Root-zone Construction (2)** Construction and management of root-zones for home lawns, golf courses and athletic fields. **Sp**
- 450 Specialty Landscape Construction (3)** Methods of design, materials, and construction techniques for specialized components of the landscape industry. Irrigation systems, outdoor lighting, garden ponds and water features. **Fa**
- 457 Weed Management (3)** Principles of weed interference, integrated management, herbicide selectivity and behavior, specific recommendations for various crop and non-crop situations. **Fa**
- 462 Professional Development in the Turfgrass Industry (1-2)** Exposure to career development opportunities in turfgrass science and management. *Contact hour distribution: 1 hour. May be repeated. Maximum 5 hours. Recommended Background: Plant Sciences 240. As needed.*
- 466 Turfgrass Strategies (2)** Case studies of turfgrass management issues and discussion of their resolution. Development of problem solving skills in areas related to turfgrass management.
- 470 Professional Practices for the Green Industry (3)** Professionalism, sales, sales proposals, budgeting, managerial skills, estimating, specifications, and contract management in the turf, public horticulture and plantscaping professions. *Registration Restriction(s): Minimum student level – senior.* **Sp**
- 475 Professional Issues in Bioenergy (3)** Study and discussion of professional issues and practices in the bioenergy field, including economics, policy, engineering, processing, agronomy, biotechnology. **TBA**
- 480 Advanced Landscape Design (4)** Comprehensive application of landscape design skills to a variety of project experiences with an emphasis on landscape planning and analysis, planting design, and materials estimating. *Contact Hour Distribution: Two 3-hour labs.* **Fa, Sp**
- 485 Computer Aided Landscape Design (3)** Overview of Computer Aided Design (CAD) as it relates to landscape design and construction. Emphasis on development of landscape design drawings through utilization of LANDCADD software. *Contact Hour Distribution: Two 3-hour labs.* **Fa, Sp**
- 494 Professional Horticultural Communications (3)** Communication for public horticulturists through written, oral and visual media. Emphasis on communication skills using proper writing techniques and grammar for print media, brochure design using desktop publishing, slide show development, oral presentations, and video use for educational and informational presentations in ornamental horticulture. **Sp**

500-Level Courses:

500 Thesis (1-15) *Grading Restriction: P/NP only. Repeatability: May be repeated.*

- 501 Special Topics in Plant Sciences (1-3)** Topics to be assigned. *Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.*
- 502 Registration for Use of Facilities (1-15)** Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. *Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.*
- 503 Non-Thesis Project (1-2)** Library, field, or laboratory project under supervision of faculty member. *Repeatability: May be repeated. Maximum 4 hours. Comment(s): For students in non-thesis option only.*
- 504 Seminar (1)** Presentations and discussion of topics. *Repeatability: May be repeated. Maximum 2 hours.*
- 511 Seed Biology and Physiology (1)** Discussion and readings related to the seed as a biological system: its formation, development, dormancy, germination and viability. *Sp, alternate years (even numbered).*
- 513 Fungal Epidemiology and Disease Control (2)** (See *Entomology and Plant Pathology 513.*)
- 515 Agroecology (3)** Application of ecological concepts to management of horticultural, agronomic and biofuel cropping systems. Examination of plant physiological ecology, population ecology, community ecology, and ecosystem ecology within the context of agroecosystems; discussion of current research in agroecology; assessment of sustainability of cropping systems from environmental, economic, and social perspectives. 2 hour lecture; 1 2-hour lab. Credit Restriction: Students may not receive credit for both 415 and 515.
- 525 Research Ethics in the Life Sciences (1)** How good research conduct and knowing the rules of science can enable success in life science research. Bioethics is not a focus. (Same as *Animal Sciences 525*) **Fa**
- 530 Integrated Pest Management (3)** (See *Entomology & Plant Pathology 530.*) **Fa**
- 532 Environmental Plant Ecophysiology (3)**. Physiological and ecological principles of plants and the relation of those principles to plant responses to the environment. Water relations, gas exchange, stress physiology, seed biology, plant competition, plant defense. *Recommended background: Plant physiology course. Fa, alternate years (even numbered)*
- 536 Ecology of Grazing Land Systems (3)** Multi-university, field-oriented course. Components and functions of grazing lands and how these vary in different ecoregions; research needs, objectives and techniques in soil-plant-animal research; forage-livestock ecology and systems in grazing lands (cropland, pastureland, rangeland and forestland); role of forages in conservation practices, wildlife habitats, and sustainable agriculture; and industries involved with forages and livestock. Requires two-week field trip, inclusive report, and examination. *Registration Permission: Consent of instructor. (Same as Animal Science 536.) Su, alternate years (odd numbered)*
- 537 Plant Nutrition (3)** Effect of plant nutrition on biochemical and physiological processes in plants. **TBA**

- 538 Turfgrass Pathogens and Management (3)** Identification, classification, and management of turfgrass pathogens. Recommendations and development of management plans for golf course, athletic field, and home lawn turfgrasses. *Contact hour distribution: 3 hours. Credit Restriction: Students may not receive credit for both 438 and 538. Recommended Background: Entomology and Plant Pathology 313, or consent of instructor. Sp*
- 541 Advanced Turfgrass Management (3)** Principles and scientific basis of turfgrass culture; adaptation, ecology, physiology, climatic influences on grass culture; clipping and water management; design. *Contact Hour Distribution: 3-hour lecture and one 1-hour lab. Sp*
- 552 Plant Biotechnology and Genetics (3).** General principles and techniques used in plant modification. Principles of molecular and transmission genetics as applied to plant biotechnology and plant improvement. *Credit Restriction: Students may not receive credit for both 452 and 552. Sp*
- 553 Introduction to Plant Breeding (3).** Introduction to general principles, practices and techniques used to breed plants, select traits, and develop crop cultivars: including biomass feedstock crops. Concepts discussed will range from quantitative and population genetics, historical through conventional plant breeding (through self- and cross-pollinations) and hybridization, then end with exploration of contemporary approaches to improve plant traits including genetic engineering. *Credit Restriction: Students may not receive credit for both 453 and 553 Sp, alternate years (odd numbered)*
- 554 Plant Biotechniques (3)** Lectures will discuss recombinant DNA technology, molecular assisted breeding of economically important crops, gene cloning and transformation technologies. Examples will be given of food and ornamental crops, pharmaceuticals, and renewable energy sources produced using biotechnology as well as potential risks of this technology. Labs will include electrophoresis, tissue culture, plasmid preps, genomic DNA preps, PCR, plant transformation, genomic techniques. *Contact Hour Distribution: 1-hour lecture and one 3-hour lab. Credit Restriction: Students may not receive credit for both 454 and 554. Fa*
- 561 Statistics for Biological Research (3)** Application of statistics to interpretation of biological research. Notation, descriptive statistics, probability, distributions, confidence intervals, t- and chi-square tests, analysis of variance, mean separation procedures, linear regression and correlation. *Credit Restriction: Students may not receive credit for both 561 and 461. Fa*
- 569 Teaching Practicum (1-3).** Supervised experience in teaching. May involve preparation of lectures and teaching aids, preparation and supervision of laboratory exercises, evaluation of student performance, and for second year graduate students, responsibility for course delivery. Repeatability: May be repeated. Maximum 3 hours. *Registration permission: Consent of instructor.*
- 571 Design and Analysis of Biological Research (3)** (See Animal Science 571.) *Sp*
- 591 History and Culture of International Gardens and Landscapes (3)** International travel experience will provide opportunities to learn how historic European estates, gardens, and arboreta reflect the climate, topography, history,

philosophical social structure, art and politics at the time of their creation. Course will focus on observation of local plant material, study of different garden and landscape design styles, and will foster an appreciation of international cultures. 3 credit hours. Spring Miniterm. Course format and location: off campus-international travel, non-standard format. Impact on other academic units: None. Financial impact: will be taught by existing faculty. May be repeated. Maximum 6 hours.

592 Internship (1-2) Application of horticulture and design principles and practices in supervised, professional setting, approved by department. *Grading Restriction: Satisfactory/No Credit or letter grade.*

593 Problems in Plant Sciences (1-3) Independent study. Current topic related to technology, science or design. *Repeatability: May be repeated. Maximum 6 hours.*

600-Level Courses:

600 Doctoral Research and Dissertation (3-15) *Grading Restriction: P/NP only. Repeatability: May be repeated.*

SPECIAL NOTE: *24 hours of continuous course enrollment in 600 Doctoral Research and Dissertation are required. Once a student initiates enrollment in PLSC 600, 3 credit hours per semester must be continued each subsequent semester, including the summer session.*

602 Research Preparation (1-9) *Grading Restriction: P/NP only. Repeatability: May be repeated. Maximum 9 hours.*

603 Special Topics in Crop Physiology and Ecology (1-3) Microclimatology of agroecosystems, crop dormancy and responses to stress, physiology of crop growth and reproduction. Interactions of physiology and germplasm in crop production, theory and application of quantitative methods in crop physiology and ecology research. *Repeatability: May be repeated. Maximum 6 hours.*

605 Special Topics in Plant Breeding and Genetics (1-3) Genotype by environment interactions, estimation of quantitative parameters, mutations, chromosome dynamics, polyploidy, genetic engineering, interspecific hybridization, linkage, screening methods, genome organization. *Repeatability: May be repeated. Maximum 6 hours. Sp, as needed*

610 Advanced Plant Genomics (2) Journal club format emphasizing active class participation as a mechanism to explore the field of Plant Genomics. Each student will be required to lead the exploration of specific topics and will present a combination of three lectures and/or journal club discussions on the assigned topic. *Contact Hour Distribution: 2 hours. Sp*

634 Advanced Weed Science Principles (3) Principles of Weed Science with emphasis on herbicide chemistry, herbicide effects on plant physiology, the analysis of herbicide residues in soils and plants, weed biology, and methods to conduct research under field, greenhouse and laboratory conditions. Offered in fall, alternate (even) years. *Recommended background: BCMB 522 or 523 and an organic chemistry or biochemistry course or consent of instructor. Contact Hour Distribution: 3 hours lecture. Fa*

653 Advanced Plant Breeding (3) Principles and methodologies targeting genetic gain for crop improvement. Concepts of qualitative and quantitative trait improvement. parental germplasm, hybridization, population formation, inbreeding, genetic variance, heritability, selection methods, molecular genetic markers, genetically engineered crops. *Recommended background: 571 & a general genetics course or consent of instructor. Sp, alternate years (odd numbered)*

Several courses offered outside the Department of Plant Sciences include instructional elements that are particularly relevant in several diverse fields related to Plant Sciences. With approval of your graduate advisory committee, courses that may be taken for credit in the PS MS and PhD programs currently include:

Art:

481 Museum Studies I: Museums, Purpose and Function (3). Development of museums of art, history, natural and applied science. (Same as Anthropology 481.)

Biochemistry and Cellular and Molecular Biology:

412 Molecular Biology and Genomics (4). Nucleic acids structure and DNA technology. Mechanisms of cell division, replication, transcription, translation, splicing, recombination, DNA repair and transposition, chromosome organization, DNA-protein interaction in gene regulation, genomic imprinting, epigenetics, RNA interference and genome evolution.

(RE) Prerequisite(s): Biology 240. Comment(s): Intended for biology majors in BCMB concentration but also open to biology majors in other concentrations.

522-523 Advanced Plant Physiology I, II (3, 3). 522—Plant biochemistry and metabolism: respiration, photosynthesis, carbon partitioning, and biosynthesis of specialized plant products: terpenoids, alkaloids, phenolics and plant growth regulators. 523—Growth and differentiation of plants at molecular, cellular and organismal levels, regulation of development; macromolecular interpretation of differentiation, dormancy, germination, flowering, and senescence. *Recommended Background: 401 and 1 semester of introductory plant physiology or cell biology.*

Ecology and Evolutionary Biology:

414 Plant Anatomy (3). Cells, tissues and organs, their development in vegetative and reproductive structures of vascular plants—emphasis on seed plants. *Recommended Background: Biology 111-112 or Biology 130-140 or equivalent.*

433 Plant Ecology (3). Interactions between individuals, species, communities and their environments. Circulation of energy and matter in ecosystems. Weekly field trips or laboratory periods, and at least two weekend field trips. *Recommended Background: 330 or equivalent.*

560 Biometry (3). Statistical applications in biological research. *Recommended Background: Statistics course or consent of instructor.*

Education Psychology:

583 Survey Research (3). Overview of survey research methods. Survey design, sampling techniques, data collection methods, and analysis of survey data will be discussed.

Environmental and Soil Sciences:

434 Environmental Soil Chemistry (3). Composition and chemical properties of soils and processes that govern fate and behavior of chemicals in soil environment: clay mineralogy; soil organic matter; mineral weathering and stability; aqueous speciation; surface chemistry; ion exchange, adsorption and molecular retention; oxidation/reduction; and soil acidity, alkalinity, and salinity. *Recommended Background: 210; Chemistry 110 or 350.*

511 Soil-Plant Nutrient Cycling in Managed Ecosystems (3) Principles of nutrient cycling and soil exchange processes affecting nutrient availability to plants; management of soil nutrients to optimize crop growth, environmental implications of nutrient management; effects of both traditional and non-traditional nutrient amendments; and constraints of measuring plant-available nutrients in the soil. *Contact Hour Distribution: 3 hours and 1 rec.*

516 Soil Biology and Biochemistry (3). Soil organisms and their activities in soils: soil ecology, biogeochemical cycling of important elements, organic matter dynamics, and applications of agricultural and environmental biology and biochemistry. 2 hours and one 3-hour lab. *Recommended Background: 210 or consent of instructor.*

544 Environmental Soil Physics (3). Basic understanding of soil physical properties and processes; influence of soil physical properties on water and chemical movement in soil; practical experience in the measurement and analysis of soil physical properties, water flow, and chemical movement in soil.

Geography:

439 Plant Geography of North America (3). Characteristics and distribution of major plant communities of Canada, the U.S., Mexico, and Central America. Relationships to climate, soil, fire, and human disturbance. Long-term history and future prospects. *Recommended Background: 131 or 132 or coursework in botany or consent of instructor.*

Information Sciences:

560 Development and Management of Collections (3). Selecting and preserving a variety of items (tangible and intangible) to meet needs of particular users; community analysis; policies and procedures; evaluation; purchasing.

Sociology:

531 Research Methods in Sociology (3). Research design, measurement, sampling, quantitative and qualitative data collection techniques, data, reduction, and analysis.

633 Survey Design & Analysis (3). Systematic exploration of survey problems through student participation in design & analysis of survey. *Recommended Background: Sociology 531 or consent of instructor.*

Students may also consider:

Educational Administration

560 Grant Writing and Project Management (3) Processes of finding funding for research efforts, writing grant proposals, negotiating with funding sources, implementing and maintaining funded programs, and closing out projects at end of funding support.

Environmental and Soil Sciences

554 Environmental Soil Biology (3). Biology and biochemistry of the soil environment as it applies to environmental and agricultural processes. Topics include the soil habitat, microbial ecology and diversity, biogeochemical cycling of nutrients, biodegradation, and research methodology to investigate soil microorganisms.

Entomology and Plant Pathology:

410 Diseases and Insects of Ornamental Plants (3). Symptoms, identification, and management of diseases and insect pests that affect plants in greenhouse, nursery, and landscape environments.

512/612 Soilborne Plant Pathogens (3). Causal agents; host-parasite-soil environment interactions; epidemiology; detection and identification of soilborne plant pathogens; biological, cultural and chemical control. *Recommended Background: EPP 313 or consent of instructor. Comments: 612 for PhD students only.*

514 Bacterial Plant Diseases (3). Causal agents; host-parasite-soil environment interactions; epidemiology; detection and identification of bacterial plant pathogens; biological, cultural and chemical control. *Rec. Background: EPP 313 or consent of instructor.*

515 Physiology of Plant Disease (3). Biochemical and physiological events involved in host-pathogen interactions. Mechanisms of disease resistance. *Recommended Background: Introductory plant physiology and pathology or consent of instructor. Comment(s): MS only.*

520 Plant Parasitic Nematodes (2). Morphology, physiology, taxonomy, ecology, and management of plant parasitic nematodes, host-parasite relationships. *Contact Hour Distribution: 2 hours and 2 labs weekly for 7 weeks. Recommended Background: 8 hours of biology.*

521 Plant Virology (2). Symptomatology, epidemiology, and management of virus infection; structure, morphology, replications, transmission, purification, characterization, and classification of plant viruses; serology; plant pathogenic viroids, mycoplasmas and spiroplasmas. *Contact Hour Distribution: 2 hours and 1 lab. Recommended Background: 313.*

523 Field Crop and Vegetable Insects (3). Identification, biology, ecology and management of insects affecting field crops, commercial vegetable and home garden crops. *Contact Hour Distribution: 2 hours and 1 lab. Recommended Background: 321 or basic entomology course.*

608 Advanced Topics in Integrated Pest Management (1-3). Selected issues and topics of current significance to integrated pest management: transgenics in agriculture, issues in biological control, pesticide resistance management, ethics in pest management, environmental manipulations, epidemiology of plant diseases, biological control of plant pests, induced plant resistance, plant-microbe interactions, and new pesticide chemistries. *(RE) Prerequisite(s): 530 or consent of instructor.*

675 Scientific Writing and Grantsmanship: From Concept to Publication (3). Preparation of scientific evidence for the thesis or dissertation in scientific journals, parts of the scientific paper, graphical and tabular presentation of data, sources of funding to support research, writing research grants, the editorial process, elements of style, and ethics. *Registration Restriction(s): Minimum student level – graduate.*

See the online graduate catalog for a complete list of relevant course offerings.